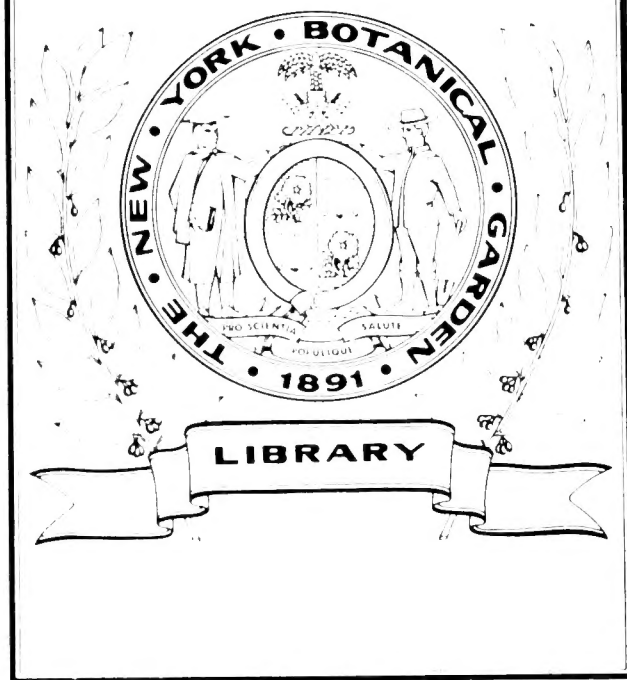
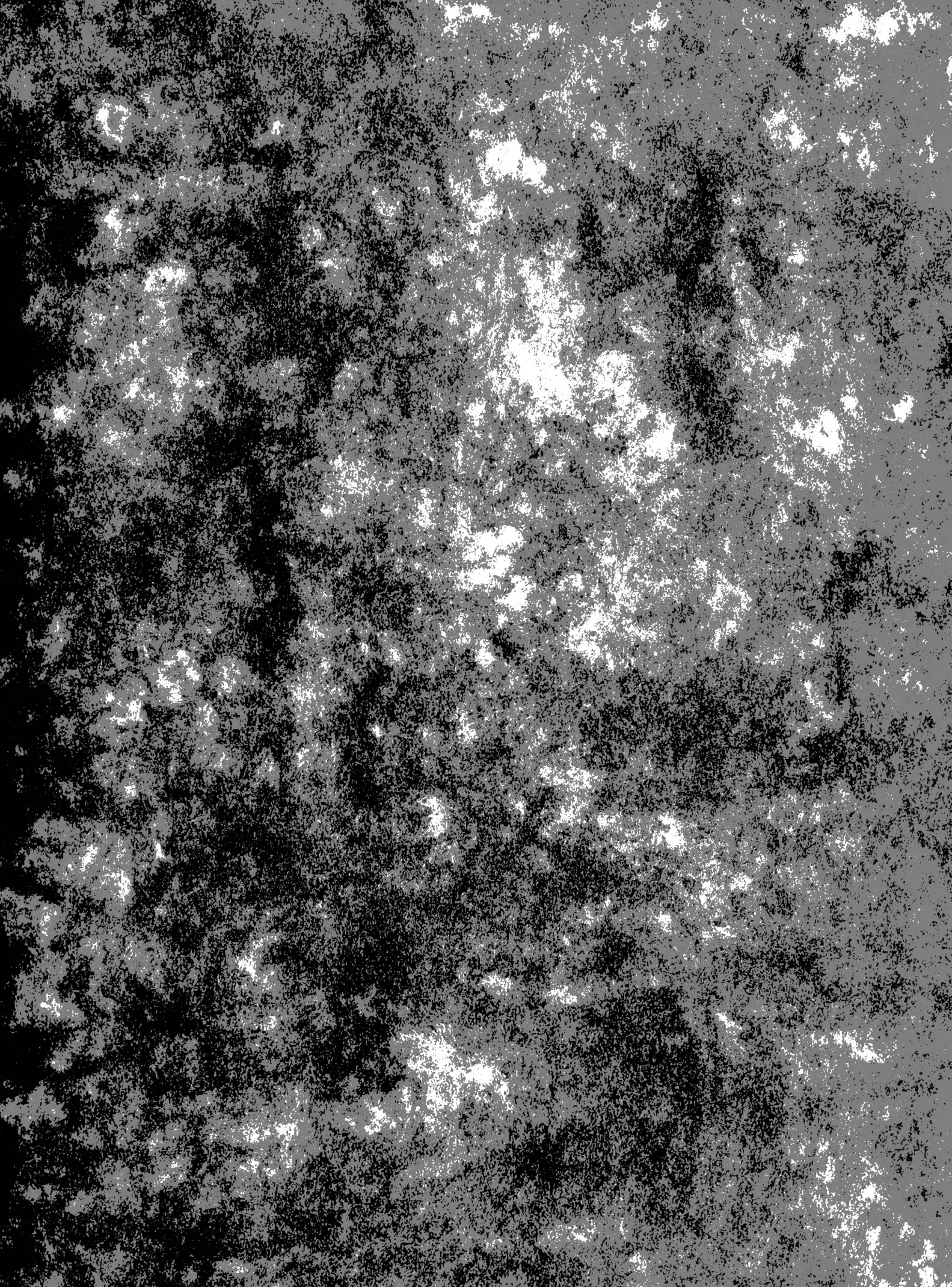


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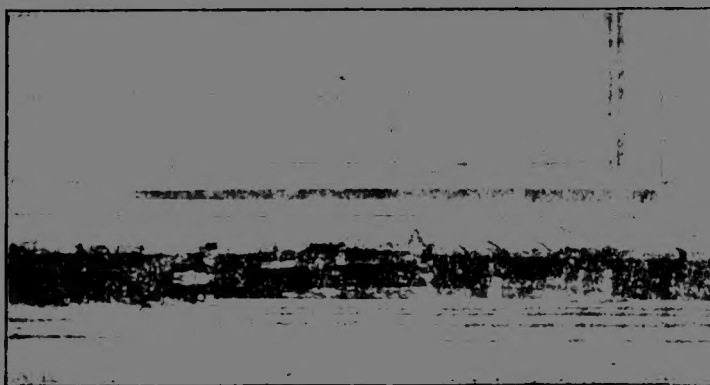




American Forestry



An Illustrated Magazine about Forestry and
Kindred Subjects Published Each Month
by the American Forestry Association
Washington, D.C.



The upper view shows the floor planking and sill of a porch, lumber for the lower photograph, the decayed and untreated lumber. Untreated timber in the lower view is from the U. S. Forest Service.



The Abuse of Wood is the Real Reason for the Present Epidemic of Substitute Materials

THE floor planking and sill of the porch and the sill and siding of the ice-house shown in the above illustrations are common examples of the flagrant abuse to which structural wood is subjected.

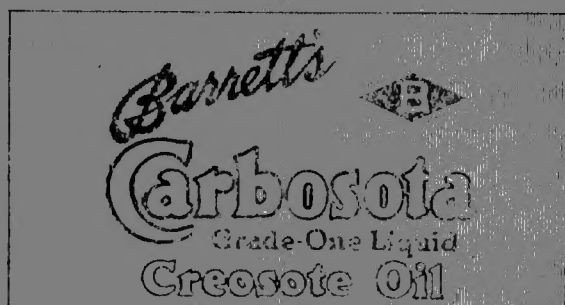
Because of such conditions, the general public's confidence in wood as a structural material has been shaken, and it now demands "more permanent" materials for building purposes. Creosoted wood is permanent.

Lumber dealers should educate their customers to preserve from decay the lumber they use, by proper treatment with creosote oil. They should be prepared to furnish a proper grade of coal-tar creosote oil, and instruct the consumer in the most suitable method of application.

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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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JANUARY 1917 VOL. 23

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A special request is made to members of the American Forestry Association to nominate for membership, friends whom they believe will be interested in the work of the Association and who would like to secure the magazine, American Forestry.

I Nominate for Membership:

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Signed..... Address.....

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AMERICAN FORESTRY

VOL. XXIII

JANUARY 1917

NO. 277

THE WILLOWS

IDENTIFICATION AND CHARACTERISTICS

BY SAMUEL B. DETWILER

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BOTANICAL
GARDEN

THE willow is an everyday tree, so humble that some one has called it "the Cinderella of trees." It has long been considered the symbol of unrequited love, and, from the time when the Psalmist recorded that the Hebrews hung their harps upon the willows and wept by the rivers of Babylon, poets have referred to this tree as the "sad willow," although it is alluded to earlier in the Bible as a "goodly tree," to be used as an emblem of rejoicing. Certainly there is nothing solemn in the shrill piping of the willow whistles that gladdens the heart of the small boy in spring time.

The willows are very difficult to distinguish botanically because the large number of species which are clearly separate and distinct have numerous varieties which grade into one another. There are about 175 different willows in the world, of which approximately 100 are found in North America. In general, the willows are native of the colder temperate regions of the Northern Hemisphere, but several are found in warm climates. The willows grow to the very limits of perpetual snow in

the mountains and no other woody plant except the birch grows so far north in the Arctic regions.

A few kinds of willows grow to be large-sized trees,

50 to 100 feet high and 2 or 3 feet in diameter, but the majority are shrubs which occasionally reach a size large enough to be termed trees. Some of the species that have their home above timber line on the mountains, near perpetual snow, lie prostrate in mats only an inch or two higher than the ground. Nature has provided many plants to clothe the waste places of the earth, and the willow is one of these. Some kinds will grow on dry soils, but mostly they are found along streams, in swamps or on moist soils. They spring up abundantly and, by rapid growth, quickly take possession of the territory suited to them. The Children of Israel were promised to be multiplied like "willows by the water courses."

The willows belong to the lowest order of deciduous broad-leaved trees, and impressions of leaves in rocks show that willows flourished when the earth was young. It is probable that they were one of the



From Pennsylvania Trees.

THE BLACK WILLOW

1. A staminate flowering branch. 2. Staminate flower. 3. A pistillate flowering branch. 4. Pistillate flower. 5. A fruiting branch. 6. A seed with hairs. 7. A winter twig. 8. Section of winter twig with bud and leaf scar. 9. A leafy branch



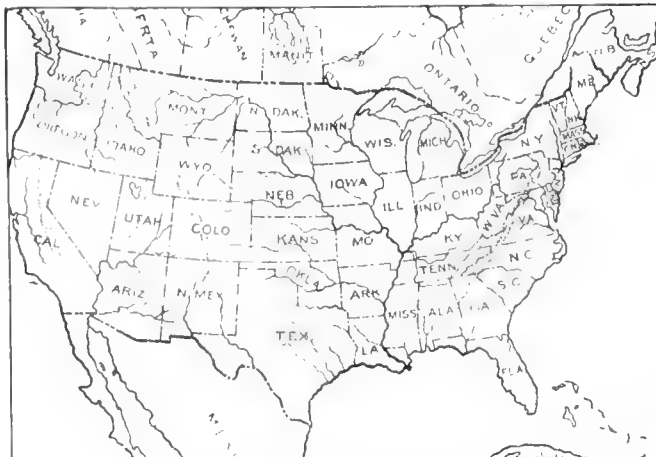
THE WEEPING WILLOW

The tree is very popular for ornamental purpose and in this photograph is shown in one of the situations for which it is best suited.

earliest forms of the large group of plants with netted veined leaves that produce seeds containing an embryo bearing two seed leaves. Although only those botanists who have made a long and careful study of the willows can be certain of accurately separating one kind from another, it is not difficult to learn the general characters of the willow family. The leaves have an alternate arrangement and are generally long, narrow and pointed, with an even margin that is not lobed or deeply cut. The leaf stem is short, and at the point where it is joined to the branch there are two little appendages (stipules) which may be scale-like and fall soon after the leaf expands, or which may resemble small leaves and remain attached until the end of the growing season. The smooth-barked twigs are long, slender and very flexible, swaying in the wind with such light, easy motion that "willowy" has become a synonym for gracefulness. The buds are covered by a single visible scale that forms a cap over the tiny silk-lined leaves within the bud. Willow wood is soft, light and easily broken.

The flowers are massed together in dense spike-shaped clusters called catkins. They are of two kinds, each borne on separate trees. The pollen-producing flowers consist of two bright yellow stamens (or sometimes three or more) attached to a scale at their bases. The seed-forming flower is a scale bearing a small sac which terminates in a forked tip. The latter is coated with a sticky substance to hold the pollen grains that lodge there to fertilize the minute undeveloped seeds contained in the sac. Nature has designed most flowers of this type to be fertilized by the wind, but in the case of the willows the sticky pollen

is carried by insects which visit both kinds of flowers in search of nectar. The nectar is exuded from tiny glands near the bases of the scales on which the stamens or the seed sacs are borne. The flowers appear early in the spring, before or with the leaves. In a very short time the seeds are ripe and the small pod, which has developed from the seed sac, splits open and frees a cottony mass. This "cotton" is composed of dense tufts



AREA OF WILLOW GROWTH



ALONG THE BANKS OF THE POTOMAC

These weeping willows on the Mall at the nation's capital add greatly to the beauty of the Potomac River shore line and to the driveway which is just beyond them. There are hundreds of these trees, many of them quite old.

of long silky hairs attached at one end to a tiny seed like the down of dandelions and thistles.

Procrastination is never a failing of the willow tribe. Wherever an opportunity occurs for the willows to gain a foothold in soils favorable for their growth, they are quick to colonize. The seeds ripen early in the growing season and, although they retain their vitality but a short time, they have the advantage of getting a good start

long before many other trees have begun to bloom. The seeds, equipped with thin silken parachutes, float through the air as easily as bits of down. Because the parent trees usually grow near the water, much of the seed is borne away on spring freshets to be cast on a distant sandbar or mud flat exposed by the receding water. The streams carry away willow twigs and branches or entire trees growing along their banks, and these root and grow when



WILLOW USED AS A WIND-BREAK

The effect of the prevailing winds is shown by the form of these white willows on a farm in Iowa. They are planted to shield the adjoining fields from the wind, and they have besides this very evident practical purpose a decidedly ornamental value.

they reach a friendly shore. The willow is easier to propagate from cuttings than any other kind of tree. A small section of a willow twig containing a bud or two, a piece of a root, or even a section of a large branch, when partly

willow leaf, and strikingly like those of the peach tree. The glossy leaf or shining willow (*Salix lucida*) is a small bushy tree or tall shrub that grows from Newfoundland to Pennsylvania, Manitoba and Nebraska. Its name gives the key to its chief distinguishing characters; it has heavy, dark-green, glossy leaves and highly polished brown or yellowish bark on its twigs.

Pussy willow, also called glaucous willow (*Salix discolor*), rarely grows to be more than 20 or 25 feet high, and is usually a shrub. Wherever it grows, from Nova Scotia to Manitoba, south to Delaware and Missouri, its flowers are well known and welcomed as a sure sign of the coming of spring. The catkins are thick and oval, and at first seem to be covered with gray fur because of the abundance of silky hairs that clothe the flower scales, but later the catkins turn yellow as the flowers develop. The leaves are coarsely toothed on the margins, bright green above, and



WILLOWS FOR PROTECTING RIVER BANKS

On the Mississippi River these great mats are built to prevent the water from washing away the banks. In the background are seen barges loaded with willows, while in the foreground men are seen completing the mat.

covered by moist soil, rapidly forms roots and shoots, and develops into a tree. Willow twigs snapped off by the wind often take root in the soft soil in which they lodge. As may be surmised, freshly cut stumps of willow trees send up numerous and vigorous sprouts. In Europe, and occasionally in America, willow trees are pollarded, that is, the tops of the trees are cut some distance above the ground to permit the sprouts to grow into numerous large branches, forming a spreading, rounded head.

The black willow (*Salix nigra*) grows to the largest size of any willow native to America. Its name is derived from the rough, flaky, dark-brown bark on its trunk. It ranges over the eastern half of the United States, and it is our largest native willow, reaching a maximum height of 120 feet and a diameter of 3 feet. It has narrow, lance-shaped leaves, finely toothed at the edges, and the tip, or frequently the whole body of the leaf, curves to one side like a sickle. The almond-leaf or peach-leaved willow (*Salix amygdaloides*) ranges across the continent from Quebec and New York to Texas, Oregon and British Columbia. It sometimes forms a medium-sized tree 40 to 70 feet high, and is one of the better-known native willows because its leaves are broader than the usual

covered with a whitish bloom on the lower surfaces. Bebb's willow (*Salix bebbiana*) is found from the lower St. Lawrence valley to Hudson Bay and Alaska, south to Pennsylvania, Minnesota, South Dakota and through



SINKING THE BIG MAT

The mat being sunk at Slough Neck Landing, Tenn. The forepart is seen fast to the bank, and in the background another large mat ready for sinking is visible.

the Rocky Mountains to Arizona. It has showy catkins much like those of the pussy willow. The leaves are short and rather broad, dull green on top, pale-green and hairy beneath, with prominent veins. It is a small bushy tree or shrub, and although it prefers moist soils, as do other willows, it also thrives on dry soil. Sand-

bar willow or longleaf willow (*Salix fluviatilis*) has a wide range, growing from Quebec and Maryland northwest to the Arctic Circle and southwest to northern Mexico and Lower California. It is never more than a small tree, 20 feet high and a few inches in diameter, but it is abundant along rivers and so quickly takes possession of sandbars and newly formed alluvial soils, that it is one of our most familiar and most useful willows. The leaves are 2 to 4 inches long, thin, narrow and coarsely notched on the edges.

In addition to many more native willows that are interesting and well worth study, we have imported several kinds from other countries that are widely planted and have become naturalized. White willow (*Salix alba*) is one of the most important of these. A variety of this species known as the yellow willow, because of the bright yellow color of its twigs in the spring time, is very common. It grows to as large size as the black willow and is far superior in rate of growth and in appearance. Crack

Napoleon willow. It is one of the finest examples of a "weeping" form of tree, forming a fountain of foliage. The long, drooping branches of this tree are so conspicuous and so familiar a feature in the landscape that it probably is our best-known willow.

Willow trees are always graceful and in old age they



BASKET WILLOW HOLT

These bundles of willow cuttings are placed in the pit, where they remain until the rods are cut up.

willow (*Salix fragilis*), another tree native to Europe, also grows to large size. It has earned its name from the brittleness of its twigs, which causes them to break off at the base when the branches are tossed in a high wind. It is an attractive tree, especially when the leaves turn upward and flash in the sunlight or gleam in the darkness of an approaching storm. The weeping willow (*Salix babylonica*) is a native of the East, as its appearance in the famous Chinese willow-ware indicates. It is said to have been introduced into Europe from Smyrna by the poet Pope; a noted specimen is growing over Napoleon's grave, at St. Helena, and has given rise to the so-called



A BASKET-MAKER AT WORK

These baskets are rapidly made by skilled workers, and often blind persons are unusually proficient in the craft. Many of the soldiers blinded in the European war are being taught the work.

attain to dignity. They have considerable value for planting for fuel and shelter in portions of the prairie regions and they also hold high rank for certain kinds of ornamental planting. They are nearly always propagated from cuttings, which should be made from wood of one or two seasons' growth. The use of cuttings is advantageous because it produces trees exactly like the parent, thus making it easier to propagate especially desirable varieties. The rapid growth of most willows on moist, fertile soils is a useful quality, especially where a quick effect is needed. Certain varieties, such as white or yellow willow, Bebb's willow or diamond willow, may be planted on dry soils. The pussy willows have attractive flowers and many other kinds, such as shining willow, peach-leaved willow and yellow willow, are desirable because of the beauty of the twigs and foliage. White and yellow willow are among the hardiest trees for prairie planting and the best for general planting; they are used for wind-breaks, hedges and screens. Crack willow is also a hardy and rapid growing species, and may be substituted for white or yellow willow. Weeping willow gives good effects when planted near streams or waterfalls, or it may be planted with Lombardy poplar where contrasted growth is desired.

The willows are comparatively short-lived, but possess surprising ability to repair broken tops or other injuries they may sustain. They have a strongly developed fibrous root system which is always seeking moisture. For this reason willows may become a nuisance when growing near buildings, since the rootlets will quickly enter and clog drain-pipes with open joints, and may cause trouble

by obstructing wells and giving the water an unpleasant taste and odor from the decaying vegetable matter. The roots also interfere with the flow of water in irrigation ditches. Willows have no very serious insect or fungous enemies, although they are sometimes attacked by a saw-fly larva which somewhat resembles the currant worm.

COMMERCIAL USES

WILLOW is not important as a tree for producing sawed lumber. Black willow furnishes most of the saw timber, which is logged with cottonwood and the other species with which it grows, and manufactured into box boards, lath and rough dimension stock. Some of the lumber is used for fixtures, such as show-cases, racks, shelving and tables. The total amount of willow lumber cut in 1913 in the United States was slightly less than five million feet, B. M. The lumber warps in seasoning but is fairly durable when exposed to moisture. The wood is tough because of a more or less twisted fiber; for this reason willow is said to make the best steamboat paddles, because it wears better in the water than other woods.

A considerable quantity of willow wood is used in the manufacture of excelsior; Kentucky reports the use of 3,000,000 feet, B. M., annually for this purpose. The wood is soft and cuts easily on the lathe, and is used for wooden ware, cricket and baseball bats, and novelties. English willow is important for the manufacture of artificial limbs. Willow is also used in slack cooperage, and small saplings are split for barrel hoops and for bands for binding boxes in which nursery stock is shipped. Charcoal made from willow wood has a very fine, even texture, and is used for artists' charcoal, and until recent years was in demand for the manufacture of smokeless powder.

By far the largest amount of willow wood is consumed on farms in the form of fuel, fence posts, bean poles, and for other uses. It makes a quick, hot fire and is a good summer firewood. The diamond willow has the reputation of making a very durable fence post, and the white or yellow willow is credited with a life of seven years if the bark is removed and the wood thoroughly cured before the post is set. Fencing is an important problem in the prairie states, and one solution is presented in raising a

quick growing wood, like willow or cottonwood, and then treating the posts with creosote. The creosote greatly extends the life of the post and thus lessens its annual cost. White willow grows in diameter at the rate of about one inch in three years, and yields from one to three cords of wood per acre per year in a well managed plantation. Growth is slower on upland soil than on rich bottom soils.

Willow has a number of interesting miscellaneous uses. Cork cutters use willow wood for whetting cutting implements. The ancients used this wood for shields because

of its lightness and toughness. Willow bark furnished the South with a substitute for quinine during the Civil War, and it also yields salicylic acid and tannin. The tannin in the bark of several varieties of basket willow was found to range from 6½ to 11½ per cent. Because of its



WILLOW BASKETS

Three useful shapes which are in steady demand in many parts of the world, the high clothes-basket, the two market baskets and the smaller one, which serves several purposes.

fibrous roots, the willow has an important place as a soil-binder. It is frequently planted along the sides of eroding streams, and on embankments or sandy bottoms, to prevent the soil from being washed away. Along the Mississippi River, large quantities of the sandbar willow are cut each year and bound into fascines for building dams that force the current to deepen the main channel and for revetments that prevent the banks from caving in and washing away. Occasionally freshly cut willow fence posts are set with the bark on; these take root and become living fence posts, capable of furnishing shade for cattle and fuel for the farm.

The growing of willow shoots for weaving into furniture, children's go-carts and a great variety of baskets is an important industry. The ancient Romans regarded the willow as one of the most useful trees cultivated, and they developed a number of varieties adapted to weaving. The shoots were made into baskets, beehives and fences. During the Middle Ages the weaving of willow baskets

became important in France and Germany, and later, in England. Previous to the European war, France, Italy, Belgium, Holland, Germany, Austria, and Russia grew basket willows extensively, and had a large export trade in willow rods and basket ware.

Experience has proved that willow makes the most durable and serviceable baskets. Basket willows intended to be used with the bark on must be smooth, tough, flexible, branchless, and cylindrical, and the color of the bark must remain a light brown. Those to be used in the peeled state must have the same general characteristics, and must remain white in color when peeled. In addition to these qualities, the rods must have a small pith and straight grain in order to bring the highest market price. In many places in the United States basket willows are grown on ordinary corn land, but generally if they are planted on high ground, the land chosen is deep and heavy, but when the willow bed is subject to overflow, the land may be poorer in quality. Usually the ground is prepared as for ordinary field crops, and cuttings, 10 or 12 inches long, are planted 9 inches to a foot apart, in



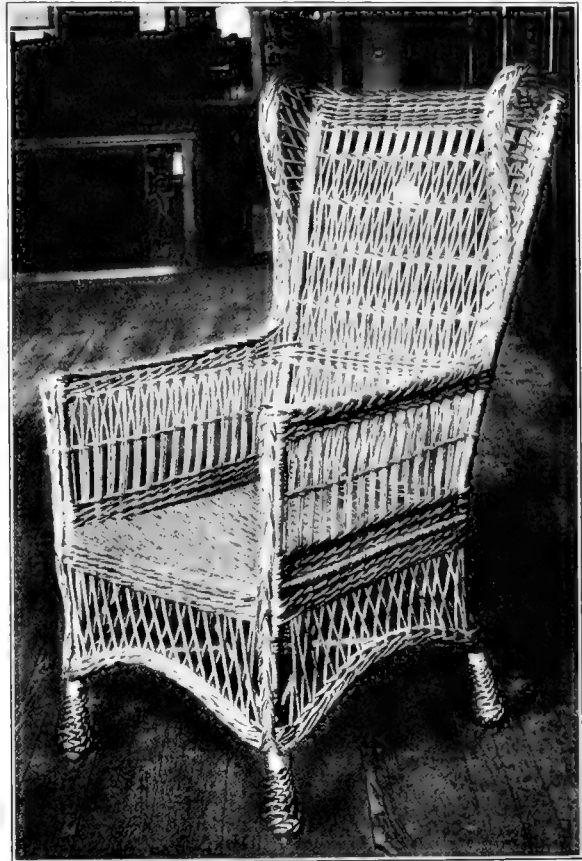
WILLOW WARE ARTICLES

A fine German lunch basket, a dog basket made in New York, and a best quality Liverpool clothes-basket.

rows $2\frac{1}{2}$ to 3 feet apart, or from 14,000 to 23,000 cuttings per acre. Sufficient cultivation is given to prevent the willows from being smothered by grass and weeds.

Osier culture was begun in the United States by German immigrants, and the industry attained its largest proportions between 1870 and 1875. At present, basket willows are grown only in restricted localities in a relatively small portion of the country. In 1909, Illinois manufacturers used 108,000 pounds of willow rods, mostly imported from Holland and Germany, at prices ranging from 5 to 8 cents per pound. The last two years has seen a decided boom, both in the growing of basket willows and in their manufacture in this country. With the cutting off of supplies of rods from Germany and the curtailment of imports from France and England the price of American rods has steadily advanced. Competition in manufactured wares has also been reduced to the point where foreign goods no longer set the market price.

An attempt to replace European grown willows with imports from Japan has not been on a sufficient scale to affect the market. The importers of Japanese rods of good quality have been asking top prices for their ware, rather than attempting to capture the market by under-



A WILLOW CHAIR

The furniture of willow is growing more and more popular and there has been a steadily increasing demand for it for some years.

selling. It is probable that high transportation costs together with limited amounts of rods available account for this.

In Liverpool, New York, the largest center of the industry in this country, higher prices are ruling than ever before. Wholesale prices of standard baskets had on July 31 increased \$1 per dozen over quotations before the war. Prices ranging from 5 to 6 cents for steam-peeled rods have advanced to 7 to 9 cents per pound; the average price of sap-peeled rods has advanced from 6 to $7\frac{1}{2}$ cents per pound, with the finer grades commanding a price of from 8 to 12 cents per pound. The crop this year in the vicinity of Liverpool will be over 400 tons greater than last year, owing to the fact that many of the old willow holts which had been abandoned were cleaned up this spring. These holts will yield a crop of about two tons of green willow rods per acre this fall. The season has been particularly good in all sections as there has been very little trouble with either insects or disease.

The problem of peeling the willows still remains acute, as machinery invented for this purpose has not been satisfactory. At present willow strippers are demanding \$18 per ton for green willows and \$20 per ton for dry willows. Willow growers and basket makers are, however,

making every effort to do this work themselves, thereby reducing this cost.

The cost of peeling willows is the one thing that is holding back the willow industry in America. In Europe, where labor is cheap, this is not important, but the cost of peeling here is almost prohibitive. The only permanent relief must come through the invention of a simple inexpensive peeling device that with two men, or with a man and boy, 500 pounds or more can be stripped. Such a machine would cut in two the cost of peeling and make willow growing profitable even in normal times. Several machines have been invented but they have not been

successful, owing more to their size and cost than to the lack of mechanical efficiency. They bear the same relation to the willow growing industry that the large powerful corn sheller would to the small farmer. Unless the growers can band together and several use one machine, such machines can not relieve the situation. As the willow growing industry is mostly confined to numerous small patches, it demands a small inexpensive machine paralleling in cost and usefulness the hand corn sheller.

In spite of labor costs, however, those who have planted willows in the last two or three years are in a position to enjoy at least a temporary prosperity.

WAR STYLES IN MATCHES

THE war now strikes the match, which, of course, is a very proper thing to do with a match, but in this case it strikes at the supply and sends the cost upward. It is all because the Russian government has prohibited the exportation of aspen wood which is what

and five dozen safety matches per box. About half of the cargo was carried on deck. Quite a lot of matches you will say when you look at it that way, but that is just about enough to supply these United States for a week—and not that long when you think of the “gimme-a-match” pest.



THE VIKEN AT HER DOCK IN PHILADELPHIA

This boat brought over from Sweden 2,440,800,000 safety matches for use in the United States. Owing to the war, styles in matches have changed. They will now be shorter.

Sweden uses in making her *sikkerhetting tandstickers*, and Sweden gets most of her aspen from Russia.

The good ship *Viken* got into Philadelphia the other day with 2,440,800,000 matches aboard. These were in 5650 cases containing 50 gross boxes of matches per case,



CARGO OF THE VIKEN

These boxes contain a week's supply of matches for the United States, and represent a recent shipment from Sweden.

As a result of the Russian embargo on aspen wood the factories in Sweden have announced that the style in matches for a while will be somewhat shorter and more slender, a measure of conservation which will effect a considerable saving, but may result in some burnt fingers.

PORCUPINE QUILLS NEEDED

PORCUPINE quills are badly needed by the Indians of Michigan, writes John C. Wright of Harbor Springs, Michigan. He says:

“Some months ago I noticed an article in *AMERICAN FORESTRY* regarding the destructive work of porcupines in one of the western states. The article was extensively illustrated, and the author said the farmers in that state considered the porcupine a great pest and of no value whatever. In this part of the state of Michigan our Indians use porcupine quills for doing fancy work on birch bark and they make many beautiful boxes, etc., which find a ready sale among tourists and resorters. Indeed the Indians in the past have almost made a liveli-

hood that way. So you see porcupine quills are very valuable to them. At the present time these animals are practically extinct here, so that the Indians are compelled to send to Canada for their supply of quills, which make them expensive and hard to get. Of course this lessens the profit on their work, which requires a great deal of time and skill to do; and so it is a real hardship. I wish to get in touch with some of those western parties in the states where a bounty is offered on the porcupine as a pest, and let them know that the Indians here use the quills and can use a quantity every year. For the most part, our Indians are poverty-stricken and in a pitiable condition, and I would like to do something to assist them.”

SCENIC MARVELS OF SEVIER FOREST

WE hear much these days of the scenic wonders of the National Parks, for the National Parks are well advertised; but we hear little, if anything, of the beauties of the National Forests, which, up until now, remain practically unheralded. The tourist who plans a western trip arranges his itinerary so as to take in the Yellowstone, Glacier Park, Crater Lake, the Sequoias, and the Yosemite in three weeks, or thereabouts, and returns home to speak wisely of St. Mary's Lake, going to the Sun Mountains, El Capitan, and the Geysers, and is satisfied that he has seen everything worth seeing. As a matter of fact he has skimmed only a little of the cream of the store of scenic wonders of the West. The National Parks comprise a few million acres of wonderful mountain scenery and freaks of nature. They are well worth seeing, but let no man, having seen them, think he has seen all or even the best of the western mountains.

The National Forests comprise some 150 odd million acres and are located along the main mountain ranges of the West from the Rio Grande to the Canadian line. They contain every possible form of mountain scenery from the low, monotonous, rolling foothills, dotted here and there with pine, to the stupendous, cliff-crowned peaks of the Uncompahgre or Cœur d'Alene.

Whether the tourist wishes to locate his camp in some quiet

valley by the side of a rushing stream, or to fight his way up along the hostile mountains to the jagged, windswept top; whether he desires merely the peaceful beauty of long, wooded slopes, or the soul-inspiring panorama of towering peak piled on towering peak, of rugged mountain and sheer precipice and endless ranges stretching away in the distance, he will find all his heart desires of such things on the National Forests.

Nor does the charm of these mountain fastnesses lie solely in the wonderful views to be had. The hot springs of the Boise, Challis, and Sawtooth Forests in Idaho are remarkable and interesting. In hundreds of places there are geological freaks which are the delight of the scientist, while in many others the delicate and masterful coloring

with which Nature has painted the canyon walls of some little-known creek is the despair and delight of envious mortals who try unsuccessfully to imitate her handiwork.

Perhaps no better example of these varied attractions is to be found than on the Sevier National Forest, tucked away down in the southern part of Utah, and, except for the local population, known hardly to one person out of ten thousand. Aside from its importance in protecting the water-shed of the Sevier River, the waters of which are used several times over for irrigation, and for the summer range for the cattle and sheep of the nearby ranchers,



Photograph by Arthur W. Stevens.

A VIEW OF THE TEMPLES OF THE GODS FROM THE BRINK OF THE CANYON. The black and white picture of this view on the Sevier National Forest, Utah, can give no idea of the delicate coloring. Some of the pinnacles shown here shade from a brilliant red at the base through lighter red and pink to pure white at the tip.

the Sevier has a number of scenic features which would draw forth many "Oh's" and "Ah's" and other similar appropriate exclamations from thousands of tourists, were it comprised within a National Park.



Photographs: Arthur W. Stevens.

ONE OF THE NARROW GORGES, SEVIER NATIONAL FOREST. This is one of the many small canyons between the rock walls shown in another picture. Some of them are so narrow and deep that it is dusk in them even in broad daylight.

The region is rough and mountainous. The timber is open and is broken by grassy parks and high, flower-bedecked mountain meadows. Rugged peaks tower from 9500 to 11,000 feet into the air, while others of lesser height but of equal ruggedness and roughness cut the region into a maze of cliff and precipice. Large, impassable lava beds occur everywhere throughout the Forest and from the mountain tops the spectacle of open park and broken cliff, of sharp, jagged mountain and rolling plateau, with the fertile valley far below, is a never-to-be-forgotten sight.

But the crowning glory of the Sevier is a line of cliffs extending for many miles along the eastern boundary of the Forest and locally known as the "Pink Ledges." Here Nature, the master artist—sculptor and painter

alike—has decorated the rock walls with that lavishness and skill which she has employed on so many of the world's show places. Broken by canyons and arroyos, long draws and steep ravines, these "Pink Ledges" present a wealth of color and fantastic architecture which must be seen to be appreciated. And in one of these canyons the form and coloring rise supreme above anything else on the continent, if not on the globe.

A visitor, seeing it for the first time, called it the "Temple of the Gods," and this title perhaps is more fitting and descriptive than any other which could be



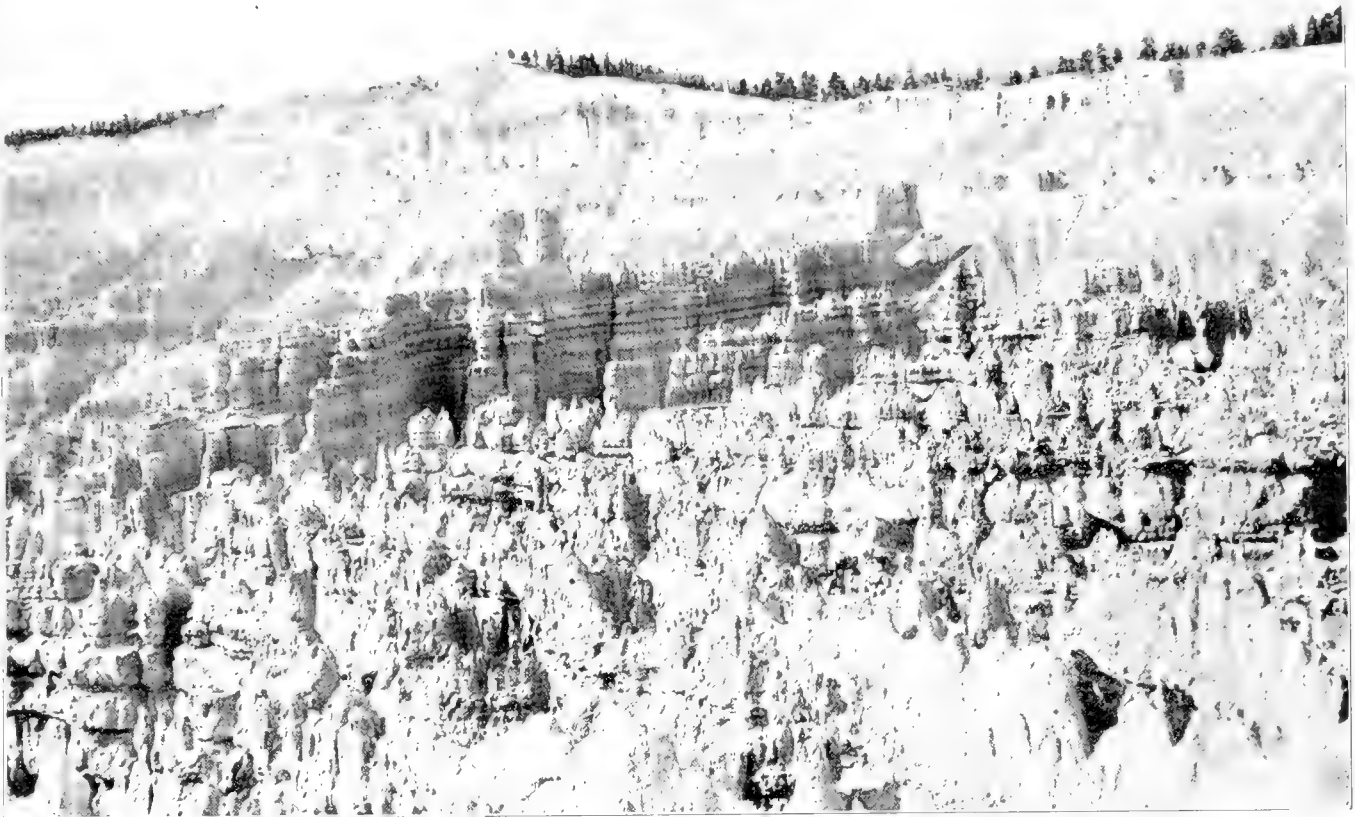
Photographs: Arthur W. Stevens.

A GORGE IN THE BOTTOM OF THE CANYON

Here is a canyon within a canyon. There are dozens of these on the Sevier National Forest in Southern Utah, and each with some particular and unusual form to it.

found. Verily each of the old heathen gods would have found him a temple to his liking, no matter how unique his taste.

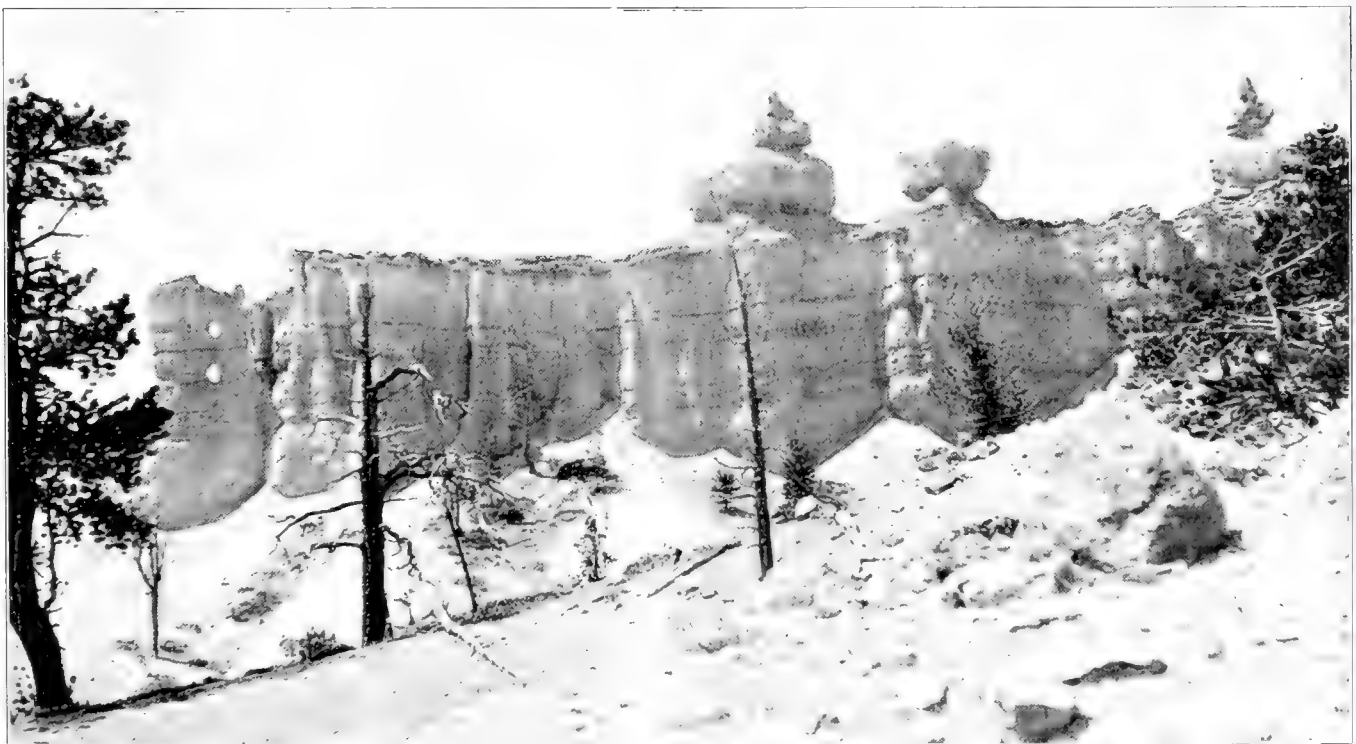
From the brink of the canyon, one looks down into what seems to be a city of temples. Chinese pagodas stand side by side with pure Doric columns. Bell-shaped towers of the East mingle with stately spires and countless minarets. Nature has been as lavish in her coloring



Photograph by Arthur W. Stevens.

A CLOSE VIEW OF ONE OF THE TEMPLES, SEVIER NATIONAL FOREST

One of the strangest sights to be seen in all the scenic West. The mass of rocks in this National Forest in Utah in the foreground is a series of perpendicular walls two or three hundred feet high and set ten to twenty-five feet apart. The tops are uniform in height and serrated like a rooster's comb. Their color is bright red, while that of the cliff in the background is white.



Photograph by Arthur W. Stevens.

SOME OF THE FANTASTIC ROCK FORMS, SEVIER NATIONAL FOREST

Nature was in a playful mood when she made these. A big wad of plastic material dumped down on a ledge, a smaller one on top of it, and then a third one pinched up to a peak—that is what they look like. But in reality they are the result of the inconceivably slow action of particles of sand carried by the wind. The rock throughout all this region is a sandy limestone.

as in the varied forms of the architecture. The main scheme is done in red and white, enlivened with browns and yellows and blues. The colors stand out vividly or shade into each other so imperceptibly that one is reminded of some vast fantastic city of dreams.

From the bottom of the canyon the formations take on new shapes and become grotesque images of strange beasts and men, as startling in their likeness as they differ from the creatures they resemble. It is as though some riotous imagination has carved from the colored rock all the phantasmagorical creatures of its creation and set them there for the favored visitor to see and wonder at.

And all this is in a National Forest, not a National Park, please remember, and an automobile can be driven to the very edge of the canyon. The Sevier is only one of 150 National Forests, each of which has something beautiful and unusual and worth seeing. There are many indeed which have far more of interest than the Sevier, but few people beside the members of the Forest Service known about them.

2,000,000 TREES FREE

THE Pennsylvania Department of Forestry announces that 2,000,000 forest tree seedlings will be available for free distribution in the spring of 1917. The following species make up the number: White pine, 1,250,000; Scotch pine, 410,000; Pitch pine, 200,000; Norway spruce, 75,000; European larch, 50,000; Japanese larch, 5,000; Sugar maple, 5,000; White ash, 5,000.

These are the seedlings over and above those which will be planted on State Forests. Anyone can secure an allotment of these trees if he will promise to use them for reforestation within the state of Pennsylvania. No trees will be furnished for shade or ornamental planting, nor will any shipments be made in less than five hundred lots.

RED SPIDERS INFEST TREES

BY EUGENE W. MENDENHALL

THE red spider was quite bad in Ohio last summer, and this is something rather unusual for this little insect to infest trees and plants in open air, this far north, for it thrives only in dry atmosphere and can be subdued upon house plants by liberal use of water. When it occurs upon plants in the open air it can be combated with any of the washes found useful in destroying scale insects.

I found it quite bad on the Kentucky coffee-nut trees and also on the plum trees.

The Kentucky coffee-nut trees were nearly all defoliated before the trouble was known. The trees are on one of the public school grounds of Troy, Ohio. The silvery webs were spun entirely over the trees.

The very dry summer accounts for the appearance of these spiders in open air in Ohio.

THE College of Agriculture of the University of California announces a correspondence study course on "Lumber and Its Uses." This course is prepared by Professor M. B. Pratt of the Division of Forestry.

A LARGE SASSAFRAS TREE

BY BERTHA M. TOMLINSON

IN a quaint old graveyard, directly opposite to the Friends' Meeting House at Horsham, Pennsylvania, stands a noble sassafras tree, estimated to be 360 years old, whose age and unusual dimensions have made it an object of interest for many years. It stands as a monu-



SASSAFRAS AT HORSHAM, PENNSYLVANIA

This tree, about 360 years old, is now nineteen feet in circumference at the ground and sixteen feet at a point breast high. Pioneer settlers of Pennsylvania are buried under it.

ment to the pioneer settlers of Pennsylvania who were buried here as early as 1719.

The first measurements, of which record can be obtained, were taken in 1852. At that time it was 13 feet in circumference at 16 inches from the ground, carrying with little diminution the same dimension on the trunk for 10 or 12 feet, where it divides into two huge branches. At present it measures 19 feet in circumference at the ground and 16 feet at about 5 feet from the ground. These dimensions are enormous when compared with the average Northern sassafras, which is seldom more than a foot in diameter. The Horsham tree is now on the decline, the trunk being hollow, but it is believed to be the record sassafras tree in the United States. During the past winter the top was broken off by the severe storms, so that but 19 feet of the main trunk is left standing. Before its decline, the tree was estimated to be over 100 feet tall. Some 20 years ago another sassafras equally as large as this stood about half a mile distant.

BRINGING BACK THE GAME

By A. A. ALLEN

A Department for the instruction and information of members of the American Forestry Association and others regarding birds and the conservation of bird life

THERE is, in this country today, a widespread awakening to the value and the necessity of conserving our native game. Law-makers, sportsmen, and the people at large, have come at last to the realization that America, at one time the richest game-producing land in the world, has been wantonly devastated. In previous pages of the Bird Department we have traced the development of game laws, culminating in the Federal Migratory Bird Law, and the treaty with Canada. We know that open seasons have been shortened, "bag limits" curtailed, and most potent of all, the sale of game ruled out in numerous states.

Laws in themselves, however, are not sufficient. There must be an organization of public opinion before they will be respected and obeyed. Organizers have not been wanting. The need for protective associations has been met by such men as Dutcher and Pearson, who founded and perfected the National Association of Audubon Societies, Burnham and Quarles, of the American Game Protective Association, Dr. Wm. T. Hornaday, and the scores of leaders of local sportsmen's organizations and bird clubs throughout the country. Through the efforts of these men, there are, today, over 500,000 affiliated sportsmen, and over a million

affiliated bird students and conservationists working for bird and game preservation.

But even though the best laws are respected and enforced by an enlightened public, the natural increase of game cannot meet the demands of the five million

owners of shot-guns. The game must be given a chance to get on its feet before it is knocked down, and unless it is well established it cannot hold its own against such odds. There are three practical methods of accomplishing this end. The first is to proclaim a long closed season for several years upon any species which is apparently losing ground until it can

regain its hold. Thus, the Federal Law provides a continuous closed season for a term of years for the wood duck, cranes and the smaller species of shore birds. The second method is the establishment of refuges where no hunting at any time is allowed. When these refuges have restocked themselves, the excess game spreads to the surrounding country where it may be hunted, but the parent stock, the nucleus, the germ, is never destroyed but goes on producing, multiplying, and restocking the surrounding country. Colonel Roosevelt, during his administration, was particularly active in establishing Federal bird and game reservations, and



Photo by Courtesy of the American Game Protective Association.

A PEN OF RING-NECKED PHEASANTS

The pheasant has been reared in captivity more successfully than any other game bird and, while not a native of the New World, it is now the commonest upland game bird in many parts of the country.



Photo by Courtesy of the American Game Protective Association.

YOUNG RING-NECKED PHEASANTS

These birds are in the rearing field of the American Game Protective Association. Questions concerning the rearing of game birds addressed to this association, 233 Broadway, New York, will be cheerfully answered.

numerous states have since followed his excellent example for the same purpose. But there are far too few of these havens to have much general effect upon the game of the country. Every township should have its bird and game refuge or what is very well termed a "community sanctuary."

Several adjoining farms including more or less waste land should be selected, if possible covering from 1000 to 5000 acres, having suitable cover and food-bearing plants.



Photo by Courtesy of the American Game Protective Association.

SOME HAND-REARED RUFFED GROUSE

These are on the farm of the American Game Protective Association. Although extremely wild when hunted, the ruffed grouse in captivity shows a very friendly, confiding nature. The breeding of grouse in captivity is still in the experimental stage.

This land should be posted and no shooting whatsoever should be allowed within its boundaries. Local gun clubs and bird clubs should endeavor to increase the available food supply by planting shrubs or even strips of grain, and should make consistent efforts toward trapping the vermin which will naturally be attracted to such spots by the increase of the game and other birds. Great horned owls, Cooper's, sharp-shinned, and gos-hawks, weasels, minks, skunks and foxes, while having their place in a "wild life sanctuary" are incompatible with a "game refuge." The stray cat is everywhere a menace.

It may seem strange to ally gun clubs and bird clubs, giving them a common purpose, when their interests are superficially so at variance with each other. But the sanctuary fulfils the ambitions of both, so they can well work side by side. The bird club will be repaid by the increase of all species of birds and the gun club by the fact that while the available hunting area will be restricted, the sanctuary will act as a great game reservoir and irrigate all the surrounding country. It is far better sport

to hunt a limited country where game is plentiful than twice the area where it is scarce.

The sanctuary, moreover, has proved a more practical method of increasing most game than long closed seasons, because the closed season takes the reputable sportsman, who is, at the same time, more or less of a policeman, from the field, and gives the poacher full sway. Where the closed season alone has been tried out, it has been found that even after five-year periods the species protected has not increased materially, because of the work of unprincipled gunners and the difficulty of detecting them. As long as any shooting is allowed in an area, the protected species will go down with the unprotected because there is such a spirit of competition among hunters. "If I don't shoot it, the other fellow will," is reasoning to which even the best, at times, descend.

The question then arises, would it be better to prohibit all hunting for a term of years until every species could recuperate? Illegitimate shooting could then be more easily detected and more efficient protection be brought about. On the contrary, it has been found the least efficient method. First, the funds for warden service, derived at present from hunting licenses, and the



Photo by Courtesy of the American Game Protective Association.

SOME HAND-REARED MALLARD DUCKS

These ducks, on the farm of W. S. McCrea are returning to the home pond. The mallard is very easy to raise and is very prolific.

thousands of dollars which are annually contributed to game protection by the gun and ammunition companies, would be removed. Secondly, the interest of reputable sportsmen would be directed into other channels: they would not be in the field and protection would be entirely in the hands of a few wardens who would be utterly unable to cope with the large number of poachers and law-breakers who would result from the prohibiting of all hunting. Thirdly, the various species of rabbits would multiply so rapidly, and with them the predaceous hawks and owls, that great damage would be done, for it would

be impossible to allow the shooting of rabbits and hope to protect any other game.

After good laws have been passed and enforced, and the community sanctuary made a potent factor in game protection, there remains still another means of bringing back the game its artificial propagation. The reproductive capacity of game birds is far ahead of what is necessary to perpetuate the species, or even to provide for a normal increase. The bob-white, for example, lays from 10 to 17 eggs in a clutch, although, in order to perpetuate the species, it is necessary to raise to maturity only two young during the entire life of the pair. The additional eggs are nature's provision against calamity, and normally, just balance or offset the number of enemies to which the species is subject. Large as the clutch seems, it by no means represents the full capacity of the bob-white, for if the first nest is destroyed, another will be built and another clutch of eggs laid. Domestic fowls have been known to lay 314 eggs in 365 days through artificial stimulation by an abundant and continuous food supply and removal of the eggs as soon as laid. Game birds have never approached this record but the bob-white, in captivity,



Photo by J. T. Lloyd.

A WILD MALLARD NESTING IN CAPTIVITY

The egg-laying capacity and the comparative hardiness of the mallard make it a favorite with amateur game breeders.

regularly lays thirty to forty eggs and the pheasant fifty to a hundred. Is it not to be expected, then, in this age of science, that man should take advantage of this, as he has all the other resources of nature, and in return for proper care of the eggs and young, and protection from the natural dangers and enemies, reap the benefits of this great reproductive ability. This is the secret of rearing game in captivity and the reason why it brings such great returns compared with mere protection of the birds in the natural state. The first eggs can be taken and placed under a hen and the bird will still produce more than she would in the wild state, and the output is thereby doubled or tripled.

Game breeding in this country is still in its infancy but we are at the beginning of an era of great activity. The greatest strides have been made with those species that already have been bred in Europe for centuries, namely, the mallard duck and the ring-necked pheasant, and during the past few years, much has been learned about breeding the bob-white. Successful experiments are being carried on also with the wild turkey, the ruffed



Photo by J. Heywood.

WATERFOWL POND ON A GAME FARM

These waterfowl are owned by John Heywood of Gardner, Mass. Our native Canada goose does well and breeds freely in captivity. White-fronted, Egyptian and blue geese are here also shown.

grouse, the California quail, and several species of native waterfowl besides the mallard including the beautiful wood duck. It is probable that before many years have passed every species of native game bird will have been raised in captivity. Think what this will mean for the game of our country.

In nature probably less than 10 per cent of the eggs of game birds develop into mature birds. By artificial cultivation as high as an 80 per cent yield has often been attained and considering that the yield of eggs can be doubled or tripled it is fair to expect twenty times the efficiency of nature under artificial propagation. How much more rapidly, then, can coverts be restocked?

The case of the ring-necked pheasant, although it is not a native game bird, speaks well for this method of bringing back the game. For years, hundreds of birds were imported and liberated in suitable coverts with the result that in only a few places did they establish themselves. Little attempt was made to breed them in captivity since it was supposed that the birds would do much better in the wild state. But the birds, when liberated, scattered so widely that when the mating instinct came they rarely found each other. The result was that up to ten years ago, the pheasant was nowhere sufficiently abundant to be a practical game bird. At about that time, however, several states established game farms, taking up the breeding of pheasants in captivity. Methods were perfected and soon

each farm was producing an annual yield that completely eclipsed all previous efforts. Today, for example, the three New York State farms raise for distribution from ten to twenty thousand young pheasants yearly and send to applicants from 200,000 to 500,000 eggs to be hatched under hens and liberated in the coverts. The effect has been marvelous and today the pheasant is the most abundant upland game bird in most parts of the state.

The reason is threefold. First, we have taken full

those males) can be shot in a season. So successful has this artificial propagation been that the annual output from the game farms and the natural increase of the birds in the coverts more than balances the annual kill and the birds continue to increase while the hunters continue to enjoy good sport.

When other birds can be raised with equal success, we



A FOSTER-MOTHER AND HER BROOD OF YOUNG WOOD DUCKS
The wood duck is the most ornamental of the American waterfowl and does very well in captivity. It has been successfully bred in an ordinary city yard.

advantage of the great reproductive capacity of the birds and have protected them against all kinds of enemies. Secondly, the birds are put into the coverts, not as adults, but either when two-thirds grown or as chicks with the hen, and have formed an attachment to the spot where released before maturing. And thirdly, proper restrictions of the shooting have been enforced. The season is opened for but four days during the fall and only three birds (and



A COLONY OF PURPLE MARTINS

These are the largest of our swallows. The many chambered house is placed on a pole seventeen feet from the ground. Birds have occupied this house for twenty years.

need have no further fear of the extermination of our game. The passenger pigeon and the Labrador duck are irrevocably gone, but the heath hen, which was following them, has been saved in time. Great hope is now entertained for the recovery of all other species, and thus the game will be brought back to our country.

THE SWALLOWS

(Family Hirundinidæ)

PERHAPS no family of birds is better known or more easily recognized than the swallows. Numbering about one hundred species, they are found all over the world, thirty-five of them being American, although only nine are found in the United States and Canada. All the swallows have long pointed wings and trim bodies, which, together with their trustfulness about the abodes of man, make them the symbol of grace, and favorites with every nation.

Six species of swallows occur in eastern United States and Canada, four of which, the purple martin, and the barn, cliff and tree swallows, are primarily blue, and two, the bank, and rough-winged species, are brown. Of the blue swallows, the purple martin is the largest. The male

is entirely blue above and below, while the female is blue above with a gray breast. Martins nest in colonies in houses provided for them or in gourds raised on poles (See AMERICAN FORESTRY, March 1916). The barn swallow is considerably smaller than the purple martin, and has orange-brown underparts. It is easily recognized by its long forked tail which makes it very similar to the common swallow of Europe appearing so often in art and literature. Its familiar cup-shaped nest is built of mud and straw, lined with feathers, and attached to the rafters of the barn. The cliff swallow is often found about the same barn but it makes a gourd-shaped nest and fastens it beneath the eaves. This gives it the common name of "eave swallow" in many places, and it is easily distinguished from the barn

swallow by a buffy patch above its tail. The tree swallow is the fourth blue swallow and it is easily distinguished from the others by its snowy white underparts. It usually nests in an old woodpecker hole but it is easily attracted to the garden by nesting boxes placed on poles. A similar species found on the Pacific coast is the violet-green swallow.

Of the brown swallows, the bank swallow is best known, nesting in large colonies in sand banks. Each pair drills a small tunnel two to three feet deep into the sand and at the end of it builds a shallow nest of straw and feathers. The white underparts of the bank swallow are crossed by a dark band on the fore-breast. The rough-winged swallow is perhaps less familiar to us, nesting as it does away from human habitations, in cliffs or creek banks, or occasionally in the deserted burrows of kingfishers.

All swallows are highly beneficial birds, feeding almost entirely upon obnoxious insects, and while the nests of the barn swallow are occasionally objectionable because of the litter of the young birds, anyone who does not encourage them to nest in his barn shows a most foolish and near-sighted policy. The modern barns with closed wagon sheds and small holes for

ventilation offer little encouragement to barn swallows. This has caused them to decrease in many places or even to revert to their original habit of nesting on the cliffs. A colony of purple martins or a few families of the other swallows will do much toward protecting an orchard from various insect

pests or freeing a neighborhood of mosquitoes, and no better investment can be made than a few hours spent in building a martin house or a few homes for tree swallows. Directions for building these houses will be found in the March number of *AMERICAN FORESTRY* for 1916. Encouragement can be given to the barn swallows by enlarging the ventilation holes, or letting the loft door stand open, and nailing cleats or driving a few nails in the rafters in suitable places. Cliff swallows, which do not like painted barns, will often accept one if a narrow strip is nailed against the wall a few inches below the eaves

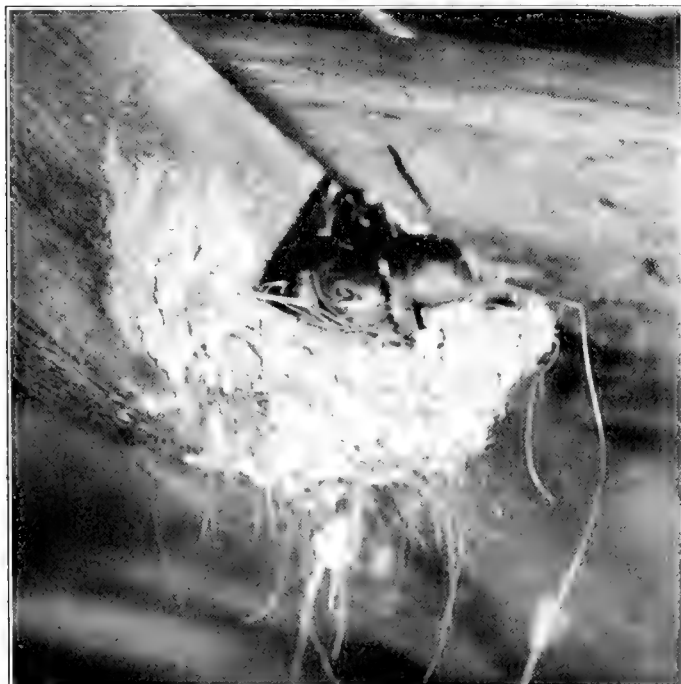


A SMALL FLOCK OF TREE SWALLOWS

These are readily distinguished in the field by their blue backs and snowy white underparts. Bird houses for tree swallows should have but a single compartment and be placed on poles about ten feet from the ground.

to give support to their nests.

Swallows are highly migratory birds, most of them spending the winter in South America. They begin to assemble in large flocks along lake shores or marshes early in July, and by the middle of September, most of them have left for the South, to be gone until the last of April.



THE NEST AND YOUNG OF THE BARN SWALLOW

This nest is built of mud and straw and fastened to the rafter of a barn. All of the swallows are extremely beneficial birds and should be encouraged in every way.



A BANK SWALLOW NEAR ITS BURROW

Bank swallows nest in colonies making tunnels into sand banks and building crude nests at the end of the tunnels.

FAMOUS LATIMER ELM DESTROYED

AT the ditch over against Balliol College" Hugh Latimer, of England, was burned at the stake 361 years ago, according to the books of reference which tell the facts in connection with the martyr's death in terse terms, and what a story the old elm, under which he preached, might tell could it but talk!

The tree became famous after his arrest and death, and has been known as "Latimer's Elm" all these years. It was shattered in a recent storm in Hadley Wood, England. Latimer who rose from priest to Bishop of Worcester, was in and out of favor at court and finally lost his life at the stake in the whirling maelstrom following the Reformation in which Cromwell upset England.

Latimer was born about 1485 at Thurcaston and was graduated B. A. at Cambridge in 1510. He gained the favor of Cromwell and obtained the benefice of West Kington. In January 1532 he was cited to appear before the Bishop of London on a charge of heresy. It was then



Copyright, Topical Press Agency.

This tree, known as "Latimer's Elm," was shattered during a recent storm in Hadley Wood, England. It was under this tree the martyr, Hugh Latimer, was preaching when he received his death warrant. The photograph also shows all that remains of the old landmark.

his following became tremendous, for human nature it would seem was much the same then as now and the public fancy turned to one who was being persecuted. Latimer recanted in April and as a reward he was made a royal chaplain in 1534 and Bishop of Worcester in the following year.

Things ran smoothly for him for four years when he resigned, according to information given out by the crown, on account of his opposition to the Act of

Six Articles, but Latimer insisted it was at the request of the king.

During the reign of Edward VI, Latimer regained his favor at court and identified himself more closely with the Reformation. This proved his undoing, and with the accession of Mary he was arrested and sent to the Tower. This was in March, 1553, and on October 16, 1555, he was burned at the stake.

PORTO RICO consumes three times as much wood annually as the forests of the island produce, declares Louis S. Murphy, of the Government Forest Service, in a bulletin on the insular forests. He says in a commercial sense, from the logging stand-point the forests of the island are insignificant, and are being constantly depleted by the burning of charcoal, the native fuel.

SO popular was the farm bulletin of National Lumber Manufacturers' Association on the preservative treatment of farm timbers, that it has been necessary to issue a second edition, which points out that decay timber is a disease, caused by infection, and preventable by proper use of creosote.

THE pork packers who boast that they use all of the pig but the squeal have close rivals in several of Pennsylvania's State Forests, where the foresters are using all of the tree but the roots and leaves. This close utilization is practiced in the distillation of birch oil, an old Pennsylvania industry which has been revived "on account of the war."

NORTH CAROLINA has started a campaign to educate school children in forest work and methods, by holding annual contests among the schools. The competition is for exhibits of leaves, fruits, flowers, seed and wood of native trees and shrubs.

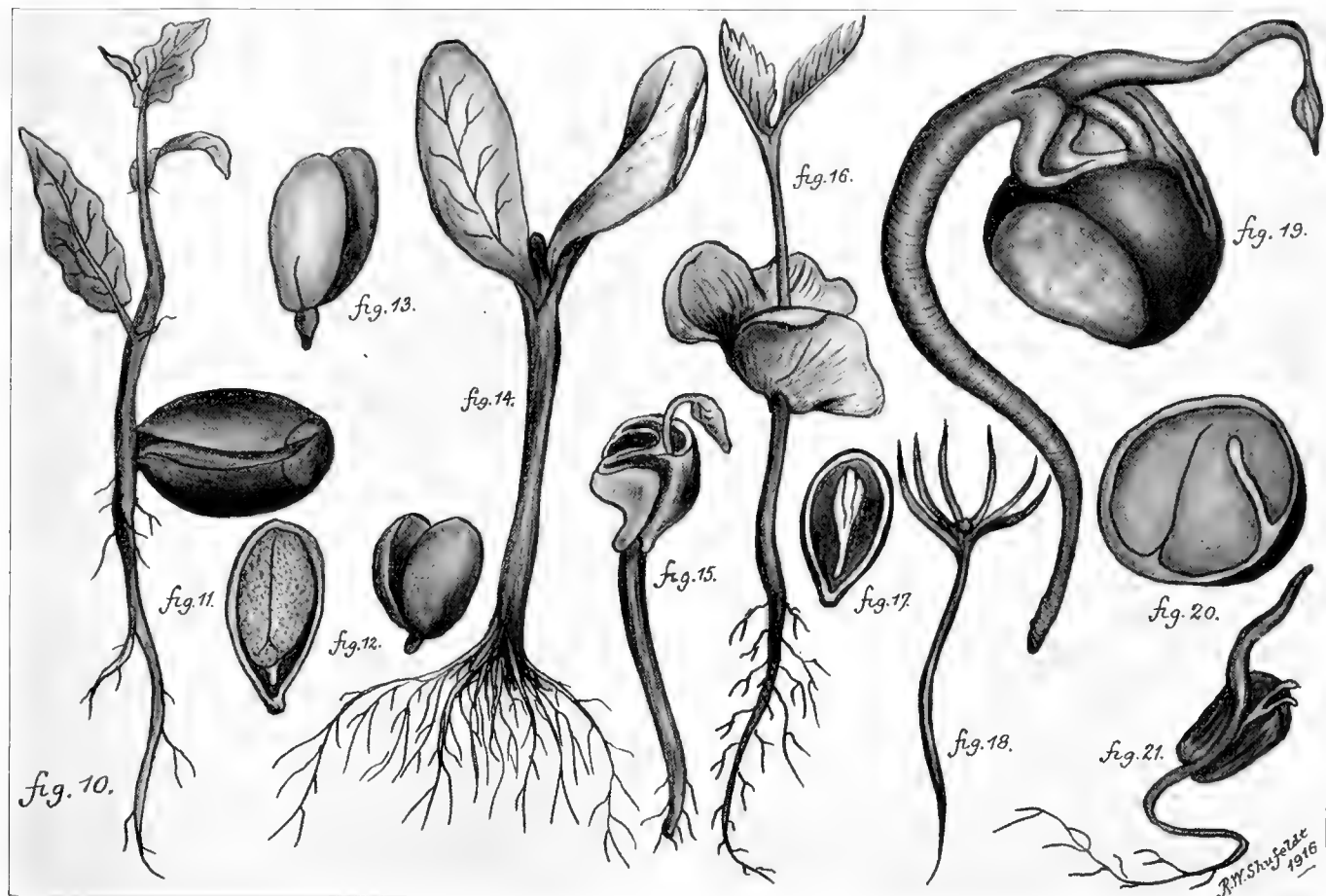
THE AMERICAN MILKWEEDS

By DR. R. W. SHUFELDT, C. M. Z. S., EDITOR OF THE DEPARTMENT OF WILD FLOWERS

THROUGHOUT the greater part of the northeastern region of the United States, there are, during the month of January, practically no flowering plants to be found in the woods or in the fields. This is especially true should the winter happen to be a particularly severe one, with little or no snow. However, south of New Jersey, and southward to northern Virginia, it has happened that, during very mild weather, some flowers, as the dandelion for example, have bloomed from late autumn until spring came round once more. The District of Columbia, for

instance, has experienced a number of such winters within the recollection of those who came into the world during the middle of the last century or earlier.

As one tramps over the snow-covered fields, or through the silent forests, where the glistening mantle of snow overlies to a large extent everything that pertains to nature and to earth, flowers are almost the very last things that come into one's head. Still, out in the open, one may meet with things that bring to memory the beauty of the spring, and summer, and fall months that made up the year which



DESCRIPTIONS OF GROWING SEEDS

Figure 10, an oak seed or acorn, with the young oak fairly started. Note that the former is split open, and that the latter consists of the *ascending axis*, bearing the first leaves, and shooting upwards into the light and air; while below the seed the *descending axis*, with its rootlets, grows downwards into the ground or soil for nourishment and support,—that is, supporting the plant in its position. Roots, as we shall see later on, are of many kinds; but in no case are they ever jointed, nor do they ever bear leaves. However they may branch, they grow for the most part downwards by extension of their free extremities or ends. On the other hand, the *stem* or *ascending axis* grows by a series of joints, which appear in succession, each supporting on its summit from one to a number of leaves. What we see in the young plant is essentially what we see in the full-grown tree, shrub, or plant, only in more marked abundance. In the case of the plants, flowers and other structures are added later on.

In Figure 11 we have a lengthwise section of an apple seed, which exposes the pair of thick *cotyledons* within; and in Figure 12 we have the appearance of the latter after they are taken out. I have separated these a little in order to show their form. In these thick *cotyledons* or embryonic leaves—or seed-leaves as they may be called—is stored the rich food that gives the plantlet its start. The same is seen in a bean (Figure 13) and in an infinite number of other plant-growths. Figure 14 shows a pumpkin seed after it gets a hold upon the ground by its rootlets. Its pair of cotyledons are still giving it nourishment, turning green prior to dispensing their stored food and becoming a pair of true leaves.

Last month, in Figures 7 and 8, there was shown the nut of the beech tree, both whole and bisected; and here we have, in Figures 15 and 16, the young,

growing beech tree. As we know, this nut is sweet and delicious, and so rich is it in nourishment that it gives the young beech tree a tremendous start, the earliest stages of which are shown in Figure 15. In Figure 16 these are expanded, and the first joint of the plantlet bears its first pair of leaflets aloft.

One of the best ways to study this most interesting and instructive part of our subject, is to get a box of convenient size and fill it with good soil, which should be kept moist and in a warm place. In this should be planted seeds of a variety of plants and trees, as those of the lemon, corn (Figure 21), pea, bean, horse-chestnut (Figures 19 and 20), pine tree (Figures 17 and 18), rice, canary seed, and so on. As germination takes place and proceeds, carefully compare the form it takes on in the different species and seeds; you will find that the cotyledons, figured and defined last month, vary enormously in the matter of form and development. Where there are but two cotyledons, the plant belongs to the *dicotyledonous* group; but when you observe your onion seed, or your grain of corn as it starts to grow, you will note that such forms send up but a *single leaf*; they are therefore called *monocotyledonous*. In the case of the pines and the like, there may be from three to five or even ten cotyledons, and when this is the case we term them *polycotyledonous*. These words are very simple when we know what a *cotyledon* is; the prefixes *di*, *mono*, and *poly* mean but one, two, and many, as they do in so many other words in our language.

In Figure 17 we have a bisected pine seed, showing the embryo, while the *polycotyledonous* young pine tree is shown in Figure 18. In some later issue next year I shall devote a few paragraphs to completing what there is to be said in regard to the germinating seed, the growing plantlet, and their various parts.

closed with the last day of December. Standing well up above the carpet of snow, one may see a score or more of the curious and artistic-looking remains of the card teasels. These have already been illustrated and described in a former article in this Department; but not so the scattered band near them of the very interesting seed pods of last year's milkweeds. These appear to be of two or three different kinds, as their varying sizes and appearances would indicate. For the most part they are either of a pale gray, or of an equally pale tan color, and the pods are borne upon tall, rather stout stalks, in groups ranging from one or two to five or six, or maybe more. Almost without exception they are all split open lengthwise, and their winged seeds have, weeks ago, been distributed far and wide, by the wind or other agencies, over the country, in order that other colonies of these remarkable growths may be started next summer.

But these pointed, big and little, empty pods, borne by their dried stalks well above the glistening January snow—out there by no means constitute all there is to be said and learned about our milkweeds. In the first place, these plants have been given a distinct family in the vegetable world, and to it has been relegated some six other minor groups or genera.

Now, as long ago as the fifth of June, 1656, there was born at Aix, France, a boy who, in the years that followed,

came to be one of the world's great botanists. His name was Joseph Pitton de Tournefort, and he died at the early age of fifty-two. In his short span of life, however, he described many beautiful flowers, and became professor of botany at the Royal Garden of Plants at Paris. Tournefort studied, perhaps, only the milkweeds of Europe; and, in cudgeling his brain for a name for the group or genus to contain them, he somehow hit upon *Asclepias*, having it in mind, for some reason or other, to commemorate the name

of Æsculapius or Asclepios, the god of medicine of Greek mythology. However this may be, our own famous as well as favorite botanist, Dr. Asa Gray, retained this name, and arrayed all of our different species of milkweeds in his *Asclepiodora*, which accounts for the name of the whole milkweed family—the *Asclepiadaceæ*. Upwards of two thousand species and varieties of these have been described for the world's flora, and probably many another is still unknown to science. Ambitious young students of wild flowers may remember this fact; and when exploring in foreign and little known lands, they should not forget to gather specimens of this most interesting and famous assemblage of plants. They call them "weeds" in many places; but somehow I never think of any plant as a weed, the more so as the Century Dictionary defines a weed as "Any of those herbaceous plants which are useless and without special beauty, or especially



OUR MOST ABUNDANT MILKWEED

FIG. 1.—Here we have the beautiful flower of the Common Milkweed or Silkweed (*Asclepias syriaca*), and also a head of buds belonging to another plant. Both are of natural size, and reproduced from one of the author's photographs of specimens collected in the District of Columbia, in the summer of 1916. In this common and very elegant species, the stem is tall and stout, frequently supporting the finest kind of vegetable hair, which may here be seen with a hand-lens. In other words, the stem is finely pubescent. Note the large and broad leaves which are short-petioled,—that is, the "foot-stalk" of the leaf is short. Distally, some of these leaves are pointed and rather narrow; others are blunt, and all the wavy margins are entire. They are downy on their under-sides. Turning to the flowers, we find them typical of this family, and of a very complex structure (morphology). In color they are cream white, while specimens may be met with in which the flowers are a dull purple, the purple in other specimens shading off into white. This one of our American milkweeds is very prone to furnish hybrids with those species nearest related to it. A study of these hybrids is an interesting field for investigation.

which are positively troublesome." I take the æsthetic side of this question, and I am free to say that all plants, and all flowers, are beautiful to me and worthy of study, however the agriculturist may regard them.

There are some nineteen species of milkweeds in the United States, not counting the Green Milkweeds (*Acerates*), of which there appear to be four species recognized. These latter have greenish flowers and other features distinguishing them; but at this writing they must be set aside, to be described at some future time. This applies also to the plants called "Angle-Pods," three genera of which contain, when taken together, some ten species that are also grouped in the milkweed family.

It is not always an easy matter to correctly identify the American milkweeds, for in their characters some of them are found to be quite near their closest relatives in the family. Such specimens as I have collected and photographed to illustrate the present article have very kindly been verified for me by Mr. P. L. Ricker, of the Division of Plant Industry, of the U. S. Department of Agriculture at Washington.

The buds and flowers of the Common Milkweed, or Silkweed, as it is sometimes called, are well shown here in Figure 1. Structurally, they are very complex,—indeed to such an extent as to render popular description quite out of the

question. This species is now known as *Asclepias syriaca*, though formerly it was called *Asclepias cornuti*. Mathews, in his "Field Book of Wild Flowers," says it is "the commonest of all the *Asclepias*, and remarkable for its cloyingly sweet, somewhat pendulous flower-cluster, which is most æsthetic in color; it varies from pale brownish lilac to pale lavender-brown, and from dull crimson-pink and pink-lilac to yellowish (the horns particularly)

and brownish lavender" (p. 368). As in a good many other species of these plants, the juice is milky white in appearance, being somewhat sticky when handled.

Perhaps one of the most interesting species of all this milkweed group is the one known as the butterfly-weed—for other reasons called the Pleurisy-root. Linnæus named this *Asclepias tuberosa*, and in Figure 5, I show a reproduction of one of my photographs of its very dainty little seed-pods. These give us no conception of the beauty of the flowers which their stalks supported during the midsummer days of last year. One thing about this species is, that, contrary to rule, its juice is not milky, although the plant is a true milkweed. It is generally found growing in old fields, or in dry, worn-out pastures; and as it often comes to be a yard or more high, we can frequently recognize its gorgeous flowers of a rich, glowing orange at a very considerable distance. Some-



THE ROUGHISH PODS OF THE COMMON MILKWEED

FIG. 2.—This illustration presents three pods of the Common Milkweed—one in full view, one crossed by a leaf, and one almost out of sight. They are of a brilliant green color, of a medium shade, and covered by a growth of longish, soft, spinous processes, of the same color as the pod. These processes disappear as the pod ripens; and but two of the pods are ever found on the same stem, consequently two plants are here shown—one behind the other. Were we to open one of these pods, we would find the immature seeds beautifully as well as systematically arranged in a curved plane, with their silk firmly adpressed against them. Note how the stem of the upper pod is bent downwards, so as to be parallel to the stem of the plant. This picture also gives an excellent idea of the leaves of the Common Milkweed of the normal type—that is, not affected in any way by hybridization.

times a single stalk will bear upwards of twenty of these rich flower-clusters. Then, too, it is not long before we appreciate why it was called the butterfly-weed, for its long, small, orange and yellow flowers seem to actually fascinate a number of our prettiest midsummer butterflies. In fact, one exquisite species of butterfly, particularly given to resorting to these flowers, is the Milkweed Butterfly (*Anosia plexippus*)—a very common, but none the less beautiful insect, possessed of a most extraordinary history, as any one may discover by reading the account of its life history, given us by our most distinguished writer on the subject, Dr. Wm. J. Holland, in his elegant volume, "The Butterfly Book."

Neltje Blanchan, in her very useful work, "Nature's Garden," gives one instance where nearly twenty different species of our most beautifully colored butterflies were attracted at one time to a mass of these milkweeds, all in full flower and growing in one place, on a "mid-summer day along a Long Island roadside."

There is much to be seen in Figure 5 of the present article, and much that sheds light upon the milkweeds as a group of plants. We must note how very slender, elongate, and spindle-shaped these pods are in

the Butterfly milkweed, very different from some of the robust ones of other species (Fig. 2). Any one of these seed-pods is smooth and longitudinally lined on the outside, while inside, the surface is also smooth and more distinctly

grooved from tip to tip. At first they are green outside, turning gradually a beautiful tawny brown as they ripen; these two colors blend in some instances. As in all American milkweeds, the very thin dark brown, flat, and roundish seeds are each attached to a silky and feathery affair, which, when the seed quits the pod after it is fully matured or developed, bears it away on the breeze to a different locality, and to a vast number of very different fates. As will be observed in the illustration, these stalks of the Butterfly milkweed branch near their extremities; the terminal ends of the branches fork, and a seedpod is borne on the tip or end of each fork. Often both pods mature and are perfect; but very frequently one of them will abort and the seeds amount to nothing. This is almost the rule in our Common Milkweed (*Asclepias syriaca*).

The entire history of the fertilization of the milkweed flowers is a thrilling, botanical romance; a whole volume of no mean proportions might be devoted to it and not then exhaust



MILKWEED PODS AS THEY APPEAR JUST BEFORE BURSTING OPEN

FIG. 3.—We have here a most interesting illustration of the seed-pods of the Common Milkweed (*A. syriaca*); it is reproduced from the author's own photograph of a specimen obtained in Maryland, in the fall or late summer of 1916. It will be observed that the leaves of the plant have all fallen off, and that the soft, spinous coat of the exterior of these pods has likewise nearly all disappeared. Note how these pods point upwards as well as downwards, and that in every instance the twin pod has aborted and fallen off from the stem. The stem, or peduncle, has also shrivelled up, and may still have clinging to it some of the fibres of the outer coat of the seed-pod. These structures are now a pale tan color; their seeds are rapidly ripening inside, and very soon these pods, had they not been collected, would have split open, allowing the silky-winged seeds to escape and to float away to start other colonies of the plant, in other regions far and near. At this stage the juices of the stem of the plant have all dried up; it is light and brittle, the color being nearly the same as the pods. On the middle pod is a beautiful, living specimen of the butterfly known as *Graptis progne*, very nearly natural size. Dr. W. J. Holland states in his "Butterfly Book" that this species occurs only as far south as Pennsylvania, while I captured this specimen in the District of Columbia (summer of 1916). In the work cited it is Figures 3 and 4, of Plate xx. The two grasshoppers are of the common species found in the same section.

the subject. Neltje Blanchan gives us something about this very butterfly milkweed in the following words which require no apology for quoting: "Surely here is a butterfly flower if ever there was one, and such are rare. Very few are adapted to tongues so long and slender that the bumble-bee cannot help himself to their nectar; but one, almost never sees him about the butterfly weed. While other bees, a few wasps, and even the ruby-throated hummingbird, which ever delights in flowers with a suspicion of red about them, sometimes visit these bright clusters, it is to the ever-present butterfly that their marvelous structure is manifestly adapted. Only visitors long of limb can easily remove the pollinia, which are usually found dangling from the hairs of their legs. We may be sure, after generously feeding its guests, the flower does not allow many to depart without rendering an equivalent service. The method of compelling visitors to withdraw pollen-masses from one blossom and deposit them in another — an amazing process — has been already described under the common milkweed. Lacking the quantity of sticky, milky juice which protects the plant from crawling pilferers, the butterfly-weed suffers outrageous robberies from black ants. The hairs on its stem,

not sufficient to form a stockade against them, serve only as a screen to reflect light lest too much may penetrate to the interior juices. We learned in studying the prickly pear cactus, how necessary it is for plants living in dry soil to guard against the escape of their precious moisture" (*loc. cit.* p. 327).

The lance-head shaped leaves of this species of milkweed are of a lovely tawny green, and spring alternately from the stem of the plant.

Sometimes—indeed quite frequently—the stalklets that directly bear the seed-pods in many milkweeds are peculiar in one respect: they are bent or curved like the capital letter S, and sometimes so twisted that the apex of the seed-pod actually points downward to the ground; this feature is well shown in some of my figures illustrating this article, particularly in Figures 3 and 5. Even the flowers themselves turn back toward the main stem in some of the milkweeds. Next summer you will have no trouble in finding the species wherein this feature is well pronounced, for the common poke milkweed exemplifies it beautifully (*Asclepias phytolaccoides*). If in the meantime you would like to see a good cut of one of this kind, you will find it in the "Wild Flowers of the Northeastern States," by Ellen Miller and Margaret



MILKWEED PODS GIVING THEIR WINGED SEEDS TO THE WIND FOR DISTRIBUTION

FIG. 4.—These bursting seed-pods of the Common Milkweed (*A. syriaca*) is one of the most beautiful sights in the plant world. This photograph was made by the author in the late summer of 1916, and satisfactorily illustrates the process or phenomenon. It shows the pods in all stages of opening, the seeds exemplifying every phase of their escape and preliminaries to migration. These pods are still roughish, and of a pale, stone-gray color. They are hard, dry, and tough, but not brittle, while the stems or stalks are easily broken. The flat, thin seeds are of a rich brown or deep tan color, and very easily detached in any case from their silky appendage. In form, they are *ovate*, with the apex attached to the silk, while the seed proper is convex on one surface, and correspondingly concave on the other, the thin part being the sharp surrounding margin. Neltje Blanchan says: "Like the dandelion, the thistle, and other triumphant strugglers for survival, the milkweed sends its offspring adrift on the winds to found fresh colonies afar. Children delight in making pompons for their hats by removing the silky seed-tufts from the pods before they burst, and winding them, one by one, on slender stems with fine thread. Hung in the sunshine, how charmingly fluffy and soft they dry!" (*loc. cit.*, p. 138.)

C. Whitney—a very good book to have on your botanical bookshelf. When you come across this species, either in an illustration or in the field—it is usually found in July, growing on a shady bank or in moist places elsewhere—note its big, oval leaves, sharp-pointed at both ends. Sometimes these leaves are half a foot long by three inches in width, their margins being smooth in outline, and not indented or notched in any manner whatever. The strong mid-rib is always conspicuously developed, the leaf itself being a beautiful clear green color above and lighter beneath. If you handle one, you will find it is soft to the touch and fine in texture. Occasionally you will find the mid-rib pinkish above, and this is sometimes the case with other plants of this group. But we must particularly study the way in which the leaves spring from the main stem. Here in this poke milkweed, they are *in pairs*, and as we go up or down the stem, we find each successive pair placed at right angles to the pair above or below it. In one handsome species of our milkweeds—the four-leaved milkweed (*A. quadrifolia*)—the leaves at the middle of the stalk or stem are arranged in a circle, while above, the leaves are smaller and narrower and arranged only in pairs. The flowers of this species are of a magenta-pink shade and very beautiful.

Students of this assemblage of plants have paid especial

attention to the leaves of the various species, and this is a matter of considerable importance. Leaves of the different milkweeds vary in the several particulars of size, form, and color; they are also arranged on the stems in divers ways in the case of the several species. As a matter of fact, this variance is so great that the best way to study these variations will be to collect, next summer, as many of the milk-

weeds as possible, pressing them carefully; you will find that you have a nice lot of material to study during the long winter evenings of 1917–1918. You should have at hand a copy of the last edition of Gray's New Manual of Botany (illustrated); in it the leaves of most of our milkweeds are briefly described. When collecting these plants, be sure to take home the *entire plant*, including the root. This is important in the case of the milkweeds especially; for, from one end to the other, the leaves in many species vary in all particulars,—that is, with respect to position, number, color, form, structure, and size.

Many of the species bear scientific specific names that invite attention to the leaves, as in the case of *A. lanceolata*, wherein the leaves are sometimes almost linear in form, or elongolanceolate. Others are the already mentioned four-leaved milkweed (*A. quadrifolia*), the oval-leaved milkweed (*A. ovalifolia*), and so on.

Mrs. Dana, in



PODS OF THE BUTTERFLY WEED MAKING GOOD FOR ANOTHER YEAR

FIG. 5.—What was said in the legend beneath Figure 4 applies, in large part, to what we see here of the bursting seed-pods of the lovely butterfly-weed (*A. tuberosa*). In several places the exact form in the seeds is well shown here, as well as their arrangement and disposition in the interior of the pod. Observe that the latter are supported on *tain stems*, and in many instances both pods may mature and contain their usual quota of seeds. These latter are lightly attached to their silken appendages; and I am inclined to believe that some of them at least may be detached before the silk has an opportunity to escape from its prison. An example of this is seen in the open pod facing the front at the upper right hand side of the illustration. We have still much to learn along these lines, and there is beautiful material here for boys and girls to study at home, as well as under their nature instructors in the schools.

her little work on "How to Know Wild Flowers," says that the "swamp milkweed, *A. incarnata*, grows commonly in moist places. Its very leafy stems are two or three feet high, with narrowly oblong, pointed leaves. Its intense purple-pink flowers gleam from the wet meadows nearly all summer. They are smaller than those of the purple milkweed, *A. purpurascens*, which abounds in dry ground, and which may be classed among deep pink or purple flowers according to the eye of the beholder" (p. 229).

During the latter part of the summer of 1916, my wife and I found ourselves making our way through a rank, old pasture that bordered the Georgetown Canal, about a mile above the Lock Tavern Club at Great Falls, Maryland. It was an ideal day for a tramp, and many species of the early autumn flowers were in full bloom. We soon came to a part of the field where a very large number of milkweeds had flourished—principally the butterfly-weed and the common species or silk-weed (*A. syriaca*). At the time of which I write, they had nearly all gone to seed, and the sight



MILKWEED PODS OF A LONG, SLENDER VARIETY

FIG. 6.—For some reason or other, there has been a disposition on the part of the seed-pods of some milkweeds to become elongated, pointed distally, and of moderate caliber even where the girth is greatest. This is well shown in the pods here represented, which are of the blunt-leaved milkweed (*A. amplexicaulis*). These have a comparatively smooth external surface, with faint indications of longitudinal ridges. Instead of only two pods being attached to the end of the plant-stem, there are three, and all of them are in good condition. The other stem in the picture supports only two, the bases only of which are seen, and they are in perfect condition. This species has been named the blunt-leaved milkweed for the reason that the terminal apex of the leaf is bluntly rounded off, which is unusual in the leaves of this genus of plants. The insects shown on these pods are representatives of either the family *Penatomiidae* or the *Coreidae*, which contain the well-known stink-bugs and the ill-smelling squash bugs. One other little beetle is very frequently found on the milkweeds in the summer time, especially on the common milkweed, and that is the red milkweed beetle. He is often present in numbers to the extent of two or three dozen on the same plant. Being fully half an inch long, with the body a bright vermillion red, with four black spots on either wing and with black antennae, he is a very striking little fellow not readily overlooked. There is also another red and black beetle about the same size, with which it must not be confused. Last summer I photographed, natural size, some thirty of these on a pod of the common milkweed, and they were kindly identified for me by Dr. L. O. Howard, Chief of the Division of Entomology of the U. S. Department of Agriculture, as the pupal form of *Lygus turcicus* Fabr. It is also found on the common milkweed in July. Attention is invited to these insects for the reason that they are so commonly found on our milkweeds that students of these plants should be familiar with them. If you study the milkweeds next summer, you will be sure to meet with the red milkweed beetle (*Tetraopes tetraophthalmus*), and with perhaps the other which is not so abundant.

was really quite a wonderful one. Scores of their dried stalks were in evidence on all sides, and hundreds of the little pods of the butterfly-weed had burst open (Fig. 5), as had many of the common species (Fig. 4). Their seeds were everywhere, borne along by the very gentle breeze that came in fitful puffs, having barely force enough to carry away those seeds that had the feeblest hold upon the pods that harbored them. Some of the pods that had just split open looked as though a brown-scaled fish had been neatly packed away in them; but this illusion was dispelled in the case of others by their being so far matured that the winged seeds were already emerging from them. The sight was truly an extraordinary one, made all the more so by the great abundance of the stalks in view, and by the presence of so many other gorgeous plants in full flower, as great masses of the little, white, wreath-aster, the New England aster, enormous specimens of poke-weed (*Phytolacca decandra*), two or three of which were over six feet in height, with great, intensely scarlet trunks and limbs, and with hundreds

of magnificent bunches of blackish berries drooping from them. Tall, rank grasses grew everywhere; extensive patches of the blue boneset (*Eupatorium caelestinum*), some golden rod and golden aster, and a whole lot of other flowers. But the milkweeds, with their masses of winged seeds gently floating upon the breeze, formed the principal attraction—simply beautiful in the blaze of the sunlight of that exquisite autumn afternoon.

These silk-tufted seeds and these tough milkweed stalks have both some commercial value. The former, mixed with flax or wool, can be woven into a fairly useful fabric, while the latter have been used by our paper manufacturers, which last might well be considered at the present time, when those interested are cudgeling their brains to find material for this purpose. The stalks of the dead cotton plant have a similar use, and there are doubtless others that can be made to furnish stuff from which paper can be made. Prodigious America should promptly turn its attention to this matter, in order to save the thousands of valuable trees that are now being sacrificed to this end.

Some of our milkweeds seem to never have received a common or vernacular name, and descriptions of them are not to be met with in the popular works on our plants and flowers. Among these we find *Asclepias amplexicaulis*, first described by the botanist James Edward Smith, though I believe it was the *A. obtusifolia* of Michaux before him. These are the species the young student should give his best attention to, and let his researches be recorded. The species just named is found in sandy places, from New England to Nebraska and southward. Other species are in the same case, and their scientific names can easily be found in Gray's Manual.

Before leaving them I would invite attention to the peculiar seed-pods of the *A. amplexicaulis* mentioned above. These are of some size and spindle-formed, and I found at least three of them springing from the upper free end of the stem of the plant which bore them; in other cases there were but two (Fig. 6).

Curiously enough, we have at least one species of milkweed in which the seed has, sometimes, no silky attachment,—that is, no coma. This is the case in *A. perennis*. Again, we must be on the look-out for hybrids among these interesting perennial herbs; not a few have already been found, and others will be by careful search in the regions where many kinds of milkweeds flourish.

No member of the milkweed family ever attempts self-fertilization, as is the case in so many other flowering plants. As a consequence, the milkweeds have thriven tremendously, and are now represented in zones and places suited to them around the entire world. Fertilization in them is performed wholly through the agency of insects, and among these are principally to be reckoned many species of butterflies, bees, flies, beetles, and wasps. Doubtless, too, during the night, moths and other insects perform a similar service. The story of the fertilization of milkweed flowers reads like a fairy-tale, and much has

been published on the subject. Professor Robertson has given especial attention to this line of research work, and it is truly marvelous what a chapter it makes in botany and natural history. In short articles like the present one, it will be quite out of the question to take the matter up, but this may be done later in another connection. Next summer, however, no more interesting study could be taken up than that of the intimate structure of a single milkweed flower, with a careful investigation of the suckers, feet, and habits of representatives of all the insects I have enumerated above. When this has been sufficiently mastered, a moderately strong hand-magnifying glass with considerable field can be used to study the flowers *in situ*, as they grow in nature, at times when the insects mentioned are visiting them. Note how the flowers have come to assume structures and forms that compel these insects to carry away the pollen from them, to fertilize the flowers of other milkweeds far and near. It is truly an extraordinary chapter in nature's ways, and by no means an unprofitable one to look well into. Try it! And if you love novelty and ways that are passing curious, I am sure you will make more than one visit to the milkweeds with your magnifying glass.

So it will be seen that the preservation and extension of milkweeds is sure of accomplishment; the flowers are not self-fertilizing, and their seeds, which are very abundant, are provided with a means ensuring widespread distribution.

All plants are not thus fortunate with respect to their conservation—indeed, few plants are—as I have clearly pointed out in AMERICAN FORESTRY in a previous issue. This inclines me to say a word here in regard to a matter recently brought to my attention. I have been given to understand that Mr. Alex. J. Negley, of Pittsburgh, Pa. (305 N. Negley Ave.), who is greatly interested in the conservation of our wild flowers, has lately been making some very important experiments in that direction. Mr. Negley has collected large quantities of the seeds of such plants as foxglove, larkspur and golden aster (*Chrysopsis*) and when down, I think he said somewhere in Florida, he threw these seeds from his motor car into likely places on both sides of the road which he traveled, with the hope that some of them would germinate and spread their kind in the new localities. This they did, more abundantly than he anticipated, and very soon the people living in those places spoke of the new flowers that were appearing in their region; others noticed them in passing over those roads in their cars. This admirable work should be extended over very much larger areas; in fact the U. S. Department of Agriculture should take hold of it, if it has not already done so, and scientifically enlarge upon the suggestion so thoughtfully put on foot by Mr. Negley. Many of our most beautiful flowers are being exterminated over wide areas, and we should most assuredly make every effort to preserve those that are harmless as well as very beautiful, in that our descendants may enjoy them as we have. This should be looked into at an early date, and steps taken to have it assume a practical form.

FAMOUS MORO ROCK

BY MARK DANIELS

MORO Rock is on the north side of the middle fork of the Kaweah River in Sequoia National Park. It towers four thousand feet above the river bed directly below it and commands a view of the Great Western Divide to the east. Why it has been named Moro Rock no one can tell, for it has none of that individuality which would suggest its name, although it is about as fittingly named as is Florence Peak.

The road from the Park headquarters in the Giant Forest swings around the edge of the plateau to a point only a few yards from the shoulder of this mountain of granite. From the road a trail leads out on to the rock and a few crude steps have been shaped so that it is possible, with about that degree of safety which our Federal Government generally provides for its tourists, to scale the point of the rock from whence the astounding views to the east and the west may be had.

To one who has sojourned for any length of time in the district, Moro Rock presents an ever-fascinating lure, for the scenes that may be beheld from its summit are never the same. At times, the great canyon of the middle fork of

the Kaweah stands out in bold and sharp relief through the crisp atmosphere. At other times a gentle mist seems to hover over its slopes and the scene takes on much of the character of the Scotch Highlands. Again, black thunder clouds will be rolling up through the canyon, and the lightning flashing over the crest of the Great Divide converts the entire gorge into a great cauldron of infernal tempests.

The headwaters of the Middle Fork of the Kaweah River enter the main canyon only a few miles above

Moro Rock, and at the junction some of the best fishing in the district is to be had. Fishermen who traverse the trail that skirts the head of the canyon invariably complain that the fifteen miles from Park headquarters to the next camping place are the longest fifteen miles they have ever traveled. From my observation, I know that the time necessary to cover the distance need never be so long as that spent by the anglers, but they invariably stop at the stream crossings to cast just once or twice in the tempting pools, which accounts for the length of time which they consume on the trail.



THE GREATEST OF MORO ROCKS

Almost every scenic area has its Moro Rock or castle—but this on the north rim of the middle fork of the Kaweah River Canyon, Sequoia National Park, California, is the daddy of them all.

FRENCH FOREST DESTRUCTION

BY URBAIN GOHIER

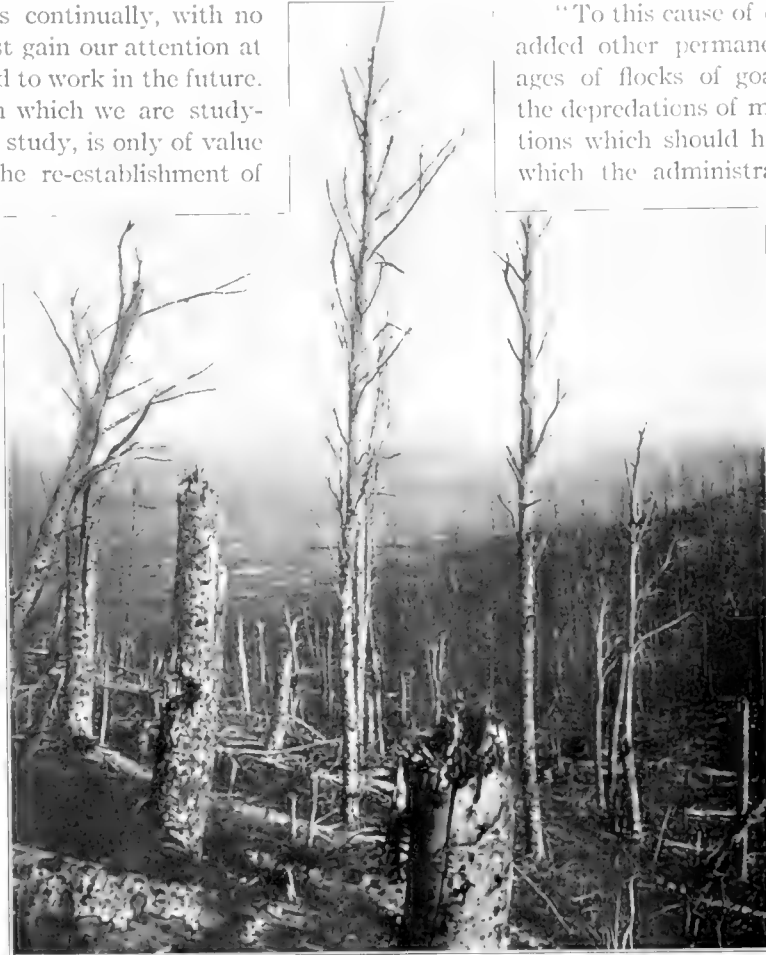
AT all times war has destroyed men and animals, houses and temples, farms, castles, and cottages. The present war destroys more, the forests. The peril of deforestation and the problem of reforestation, which face us continually, with no actual future results, must gain our attention at once if we wish to live and to work in the future. The agricultural situation which we are studying, and shall continue to study, is only of value when connected with the re-establishment of French forests," writes Urbain Gohier in a recent number of *Le Journal, Paris*. "For, if there are no more trees, there is no fertile soil, no question of cultivation, no agriculture.

"Even before the war it was the Germans who contributed most to the destruction of our forests. They had invaded their own forest kingdom and wished to spare it in the future. They had need of wood for constructing their railways; they had attacked our forests and methodically destroyed them. The Himmelsbach firm of Fribourg-en-Brisgau; the Falks of Sarrebourg; the Schmollers of Darmstadt, and other Germans established at Nancy or at Paris, acquired wholesale all the wooded lands, not only in the East in the Vosges, Ardennes, on the Meuse, the Meurthe-et-Moselle, and Upper Marne rivers, but as far as the basin of the Loire. They did not merely exploit these forests—they razed them completely, sold the trees, parcelled out the land, or leased it for hunting. As a rule, the trees paid the purchase price and the sale of the land formed the profit. The owners of the forests succumbed to the temptation of ready cash, at first because the offers were high, later, because a forest owner maintains a seigniorial appearance of extravagance which makes him liable to public exigencies and to the animosity of legislative demagogues. Such domains pay 80 per cent of their products for taxes. The forest owner seized with alacrity the opportunity to realize on his

patrimony and to place the capital in more prudent investments. In a period of ten years two hundred thousand hectares of forest gave place to desert tracts which remained unproductive for some time.

"To this cause of destruction naturally were added other permanent causes. To the ravages of flocks of goats and sheep were added the depredations of mountain dwellers, devastations which should have been punished by law, which the administration tried to reach but which electoral influences encouraged by guarantees of impunity.

"Thus the deforestation of the plains completed that of the declivities. The water courses, formerly well-regulated, were changed into torrents; the climatic conditions of the country were completely overthrown; and inundations alternated with drought in all the French river basins. The old oaks disappeared because they were needed in all parts of the world for railways; stands were felled to furnish tannin to different industries; journals, newspapers and paper of inferior books devoured the pines, beech, poplar, and linden.



A SHELL-SWEPT FOREST OF FRANCE

The utter destruction of these forested slopes "somewhere" along the battle line in France makes the problem of future forests in the war-ridden sections a serious one, and one which is already attracting the attention of French foresters.

"And now the artillery is destroying the trees. Bodies of the dead trunks of trees strew the soil with the debris of men and horses.

"Where the forest once stood are only seen scattered broken stumps. The forest has disappeared. A poet in the good old times arrested the arm of a woodcutter who caused to flow from beneath the "rude bark the life blood of a nymph"; but all the rhymers of the world can avail nothing against the rattle of shells and explosives belched forth by thousands of cannon.

"While the forests and groves of the immense battlefields are effaced or scattered under the lightnings of artillery, the forests of the interior and even the trees bordering the roads all over France are falling under the blows of the ax because railways must be improvised at the front and planks, supports, timbers for crosspieces



WAR'S DESOLATION IN A ONCE BEAUTIFUL WOODED VALLEY

Over this ground, near Verdun, France, has for months swept a storm of shot and shell. Practically every foot of it has been fought over and thousands have died, while where once stood fine trees there remain some gaunt, shattered skeletons, mute monuments to the tremendous struggle.

in trenches, and forts, sheds, magazines, and barracks of the military zone are needed.

"What will remain standing tomorrow?

"Even in the Bois de Boulogne, at the alarm in the beginning of the war, the trees were cut down which might hinder the 'defense' of three or four ridiculous pallsades. In the Jardin of Foreign Affairs, on the quai d'Orsay, a celebrated tree, venerable and magnificent, was sacrificed to establish a tennis court (15,000 francs) evidently necessary for diplomatic manoeuvres. The dryad which protected this place succumbed to the nymphs of the embassy. Down with the trees!

"If we do not restore French forests, we shall gain victories and reconquer our provinces in vain. What happened to Nineveh and Babylon will happen to Paris. Civilization cannot flourish in a desert."

A dispatch from Verdun, France, says: With the close of the war the entire line of trenches in France, extending from Alsace to the Belgium border, may be converted into a sort of national sacred forest, as a permanent tribute to the memory of the French "poilus" who died there defending their national soil.

A proposition to this effect has just been prepared by the general council of the department of the Meuse, and will soon be submitted to the French government. The plan is to buy the battleground from the farmers. Should this plan be finally accepted, future generations, not only of France but of the entire world, would always have the opportunity of visiting the line of trenches over 600 kilometers in length on which the French threw back the tide of German invasion at the battle of the Marne, and which till the end of the war will always remain the basis of France's military effort to rid her soil entirely of the enemy.

The immediate land through which these long lines of trenches run, together with the battlefields of the Somme, of Artois and of Champagne will, it is believed, never again be rendered cultivatable. Aside from the deep trenches and bayous, the ground has been so pitted with shell holes to a depth varying from a few feet to fifteen feet, and all the upper strata of soil on which fertility depends so completely wiped out, that little if any use could ever be made of the ground for agricultural purposes for years to come.

FORESTRY FOR BOYS AND GIRLS

BY BRISTOW ADAMS

THE TREES IN WINTER



AS BETWEEN skating, skeeing, sledging, and tobogganning we manage to be out doors a good deal at this winter season, and also have a better chance than in the summer to study the trees. They have uncovered themselves to us, and if we know them at all well, this is the time that they are most easily recognized. But most persons do not know them well enough to understand the messages they give us when their cloaks of leaves are off.

Last year our boys and girls went to see the objects sent by other boys and girls to the exhibit of work done by children in the country schools of New York. This was during "Farmers' Week" at Cornell University, when thousands of farmers, with their wives and their children go to school for a week at the college of agriculture. There are lessons for every member of the family, and even a nursery to take care of the "teeniest-weeniest" babies while their mothers learn about cooking, and sewing, and how to look out for these tiny ones, so they may grow up to be straight and strong boys and girls.

But that isn't what I started to tell you. Last year four farm boys came to Farmers' Week with great bundles of twigs,—just a lot of sticks and branches, it seemed. They could tell at sight what kind of a tree or bush each came from. They knew by the shape of the twig, the form of the bud, the color of the broken end,—as with the brown pith in a butternut branch,—and by a number of other signs that they had learned. The professors in the forestry school at Cornell owned up that they couldn't have done as well as these boys did unless they had studied pretty hard beforehand.

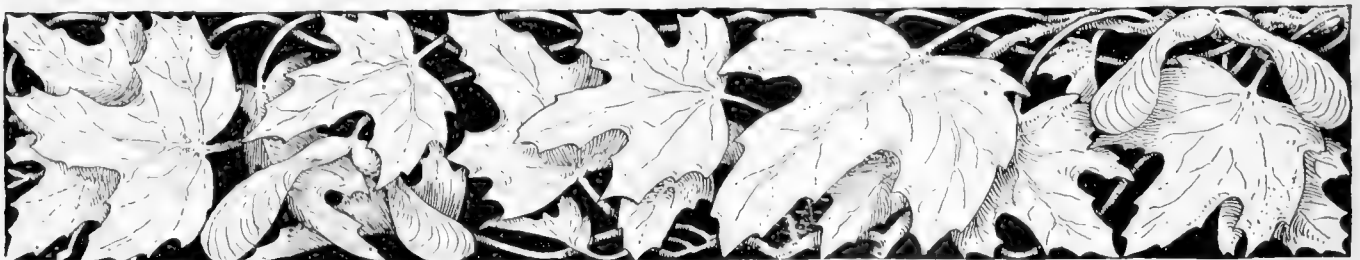
My boys and girls have an old bookcase that is their museum. Here they


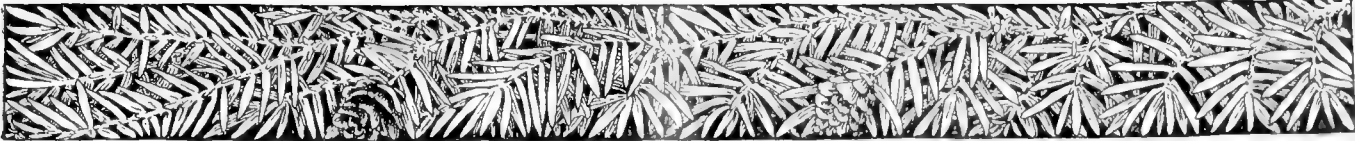
have shells, rocks, twigs, and all sorts of butterflies, moths, and other insects that their Aunt Ruby taught them to collect and mount. The twig shelf is always having additions made, and the keys that unlock their secrets are being more and more used. First, we note the bark, then the buds, as to size, shape, and color; sometimes the winter fruits are present, and these help.

HERE are some of the tags we have learned: The position of the buds is a good index; for example, maple buds are opposite one another on the stem, while those of elm, poplar, and beech are alternated or zig-zagged up the stem. The catalpa and a few others have their buds in a circle around the branch. Color will help; sassafras bark stays green all winter, basswood is reddish, and some of the dogwoods a brilliant red.

Taste seems to be Toto's favorite way of telling. Ever since he could first grab anything it went immediately to his mouth; and he has never got over the habit. Sassafras and sweet birch are easy for most of us to tell by taste, but he says that tulip poplar, soft maple, cherry, walnut, elm, and locust are just as easy when you know 'em. The leaf-scar, where the old leaf came off last fall, is another sure sign, when you know it. Some folks say that the horse chestnut got its name from the fact that its leaf scar is shaped like the bottom of a horse's hoof.

Buds are probably the surest way the twigs have of telling their names, even though they can not speak out for our ears to hear. The sign-language of the buds is sure to those who know it. And one can't expect to talk on one's fingers at school unless the alphabet has been learned. Just so with the buds! The horse chestnut buds are large and sticky; those of the beech are long and sharply pointed, smooth and glossy; basswood buds are little fat ones. Some of you will note the silky buds of magnolia, others the red colored buds of maple, and the black ones of the pussy willow. In a general way the buds are something





like the leaves that come out of them. Basswood's leaves are roundish; so are the buds. Beech leaves and buds are similarly pointed.

This can be made a fascinating game if you wish, beginning with the few twigs you know and then adding others, until you have worked up to as many as fifty. You can have contests as to who can tell rightly the names of most of the twigs.

THE TREES themselves, by form or color, are easily told from a distance. Pin oak and black gum have shapes like the spruces, and this shape shows best when the leaves are off. Each has a spire-like top and the lower limbs are drooped and spreading. Yellow willow now gleams golden against the snow, and towards spring the outer twigs are almost startling in their color. Sycamores have erratic branches which seem to have changed their minds after they started growing and gone off in another direction. The branches of the persimmon give the whole body of the tree the shape of a cylinder, and their shape, too, is always angular. This is because two branches start and one fails to develop so the other goes angling off like the Indian swastika sign. The crown of tulip-poplar is generally an oblong and the elm is likely to have a vase form.

QUITE the most remarkable fact about the trees is that they are far from being as dead as they seem to be in winter and even without leaves they

are very much alive. The hardest work a tree does is to produce flowers and fruit and this is done by the witch-hazel without a sign of a leaf to help it. The red-bud, or Judas-tree, will cover itself with bloom in the spring, but it has warmth to help it, while the witch-hazel is not even held back by the dead of winter. We know, too, that it is still pretty cold and snowy when our old friend the sugar maple begins to nearly burst with sap.

The evergreens themselves look dead. Cedars get rusty, scrub-pine and pitch-pine are yellowish, and at least sickly-looking, and the white pine grows ashy and pale. They can be hurt by harsh drying winds in winter, when the ground is deeply frozen and their roots can not keep up the supply of moisture given off by the leaves. The very dearest-looking trees of all are the larches, and tamaracks, and cypresses, which we think of as "evergreens," but which are quite the barest and most naked in winter. By contrast the fresh soft green of the new larch needles is the "springliest" of all the glad young colors of the spring time.

LOOK for the winter fun in the woods, and learn the trees' stories. Have a winter picnic after a good skee-run, if you live where snow is deep, try one anyhow. We think they are more fun than summer picnics, and there's more to see; or else it is easier to see what there is.

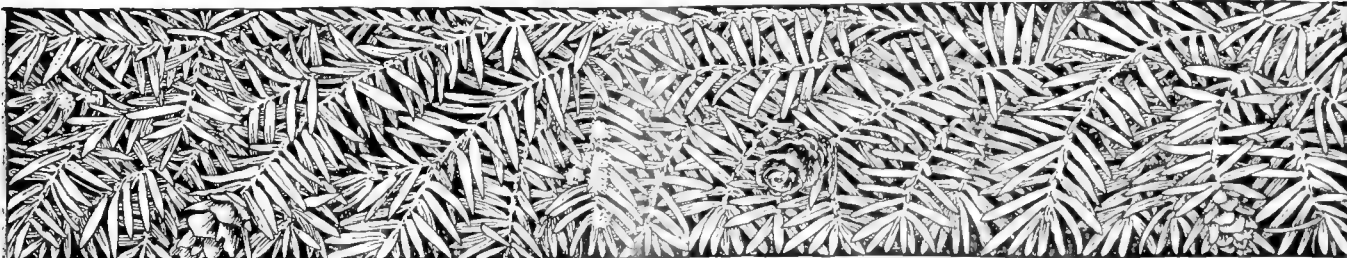


CHARADES FOR CHILDREN

Here Are Some Puzzlers for the Children. Who Can Answer Them? Those Who Cannot May Read the Answer in February American Forestry

My first is a much needed part of a house
My second a squirrel eats but never a mouse
Put these two together and then you will find
That it is a wood of the very best kind.
What is it?

My first is a part that a ship always needs
My second the way you always plant seeds
Now take these two and put them together
Then feed them some crumbs in this kind of weather.
What is it?





WHITE SPRUCE HEDGE AROUND AN ENTRANCE-COURT

Such a hedge costs but little more than privet. It is valuable all winter and is far richer in appearance. Now is the time to arrange for spring planting of hedges.

THE FUNDAMENTALS OF A GOOD HEDGE

BY J. J. LEVISON, M. F., FORESTER FOR THE CITY OF NEW YORK

HEDGES are generally planted for practical reasons, and not for mere beauty. As a rule, they serve the practical purpose of adding strength to the boundary line of a lawn or garden, of securing privacy to the premises surrounding the house, of screening out some objectionable object or of furnishing a windbreak. Its lines are thus more or less formal; but, nevertheless, when properly selected and placed the hedge may be in perfect keeping with the surrounding landscape effects and may even add considerably to the beauty of the place.

In deciding what kind of hedge to plant we must not only consider its æsthetic effects, but also its adaptability to the local soil and climate, and light conditions, as well as its freedom from insects and disease. For instance, hemlock will grow in shade and lilac will not. The hawthornes are often menaced by aphids and the rust of the "cedar apple"; lilacs by mildew and oyster shell scale; box by red spider, and spruce continually loses its compactness at the base of its trunk. To avoid all the natural pitfalls, one must thus choose carefully with anticipation of the conditions of the plant's future growth.

The varieties of plants which may be used for hedges are greater than one would ordinarily believe, if we were to observe the hedges of but one vicinity. The local nurseryman sometimes carries a limited variety of plants and the hedges of the locality often reach just that far and no further.

Foremost among the deciduous hedge plants come the privets. The one most commonly used is the California privet (*Ligustrum ovalifolium*). This is quick-growing and endures extremely unfavorable soil, moisture and atmospheric conditions. It is free from insect and fungous pests, and its cheapness makes it desirable for general use. The Japanese privet (*L. ibota*), Regel's

privet (*L. ibota regelinianum*) and the Amur River privet (*L. amurense*) are other desirable varieties of privets in common use for hedges. The California privet, above all others, however, is the one that lends itself to formal shearing. Japanese barberry (*Berberis thunbergii*) is beautiful when a low hedge is wanted. It forms a dense hedge and does not need shearing like the privets. It is hardy, droops beautifully and colors charmingly in the fall with bright red berries persisting all winter. The common barberry (*Berberis vulgaris*) and its purple-leaved variety are often used with less effect than the Japanese species.

The Japanese rose (*Rosa rugosa*) is very hardy under all conditions and forms a compact hedge that stands shearing very well. It has good foliage, beautiful flowers and large, red fruit which persist until early winter.

The hawthornes (*Crataegus*) are the favorite in England for hedges. *Crataegus oxyacantha* is the kind best adapted for hedging. In this country the hawthornes are much subject to fungous diseases, scale insects and borers, and should consequently be used rather cautiously.

Deutzia lemoine and *deutzia gracilis* are valuable hedge plants which should be allowed to grow naturally, without shearing.

The Rose of Sharon (*Althaea*) makes an excellent hedge for boundaries where a screen is wanted, but its habit is higher than the privet or barberry.

A few other deciduous shrubs which can be used for hedging purposes are: *Hydrangea paniculata grandiflora*; this, of course, must be cut in every winter; the lilacs make satisfactory hedges; Van Houtte's spirea makes a beautiful spring ornamental hedge and *Aralia pentaphylla* is so rapid a grower and adapts itself to poor soil so readily that we must not overlook it in our list of suitable plants.

The Garland Syringa (*Philadelphus coronarius*) makes a tall-growing, informal hedge.

The European beech is useful where a tall hedge is desired. The honey locust is a good defensive hedge and the Lombardy and Bolleana poplars allow close planting and form a tall screen. The Osage orange has the same value as the honey locust but does not grow as tall.

The most desirable species of this group are: box-wood, arbor-vitæ, hemlock, white spruce, common red cedar, yew and dwarf juniper.

Spring and fall are the two seasons for planting, but, if possible, spring is to be preferred.

Before planting, the soil should be thoroughly turned over to a depth of two or three feet and two or three feet wide. Mix in some well-rotted manure, and if the soil is very poor, change it entirely for a rich, black loam. This can all be done in the fall and thus save time in the spring when only the actual planting will be left to do. The distance apart at which the individual plants should be set in will vary from twelve to eighteen inches for shrubs and from eight to twelve feet for tree hedges. Do not plant too closely if you wish your hedge to look compact with plenty of lateral shoots. The roots should be carefully covered during the process of planting and spread out when set in the ground and the soil around the roots should be thoroughly firmed by ramming or by treading.

Immediately after planting, plants like privet which stand heavy cutting should be pruned



A YEW HEDGE

These hedges have many admirers and are unique for dividing rose gardens and flower gardens.



COLORADO BLUE SPRUCE

For seaside planting the Colorado spruces have proved themselves of high value.



ALTHEA HEDGE

This is especially desirable for surrounding the flower garden or vegetable garden. Do not trim them in the summer. If you plant them a foot apart they will make a solid, thick, free-flowering hedge this year.

back severely, sometimes to a few inches from the ground. This will insure the formation of a compact growth on all sides of the hedge and a better adaptation of the plant to the soil. The following year the plants should be cut a little less heavily, and by the third year the permanent shaping may be commenced. In the case of privet it should be clipped three times a year.

The after-care of the hedge consists in keeping out all weeds and in trimming the plants to induce bushy growth near the base. This is very important, particularly with young hedges. The hedge should also receive frequent cleaning so no insects can gather there and remain to despoil the growth.

General trimming of established medium-sized hedges is necessary at frequent intervals in order to insure the formation of lateral shoots for a dense appearance. The work can best be done in the early spring while the sap is still down. The formal hedge of privet and similar species should always be cut in some form of a triangle in order to obtain the greatest exposure of surface to sun and light, thereby securing a more vigorous growth of all parts of the hedge. The loose hedge of such a species as the barberry needs just to be kept down to uniform shape by the removal of stragglers. Where high stumps are seen protruding from old hedges, they should be removed and the more vigorous younger shoots allowed to take their place. All these large wounds and cuts should be covered with coal tar

to prevent disease taking hold of the plants and insects from finding an easy entrance to the interior of the plant. Coal tar is preferable to paint for this purpose because the tar has an antiseptic

and extreme cold during the winter months will be found helpful to the growth and even necessary at times.

In the matter of protection from insects and fungi the same principles apply here as to the other plants. The



40-YEAR-OLD HEMLOCK HEDGE

This is a dense evergreen wall, as rich and mature as 100-year-old boxwood; for a garden or service-court, you can consider this hemlock hedge. It is 600 feet long, 11 to 12 feet high and 10 to 12 feet wide.



ANOTHER HEMLOCK HEDGE

This treatment will give an effect similar to old yew hedge in England. Their attractiveness is partly due to the long years of skilful trimming. This hemlock hedge has had this trimming.

as well as a protective influence on the wound, while the paint only remains on the surface, drying up in course of time and eventually peeling off.

An annual mulch of leaf-mold or well-rotted stable manure, put on before the ground freezes, is also desirable for the maintenance of good hedges, and in case of boxwood and the smaller evergreen plants, protection from wind

scale or sucking insects will have to be sprayed with some oil emulsion or fish oil soap, the leaf-eating insects with arsenate of lead and the fungous diseases with Bordeaux mixture. However, these are only general instructions and the only effective way to meet insect and fungous pests is to determine in each case individually just what to do and how to do it.*

ADVICE FOR JANUARY

1. Remove the dead trees marked during the previous fall for removal.
2. Clear out cavities in diseased or injured trees and dress the wounds with coal tar.
3. In the wooded area, one can cut out all chestnut suckers coming from the old stumps of the dead chestnut trees. These suckers are likely to become re-infected with the chestnut blight and had better be cut out to prevent their smothering young trees of greater value.
4. In the wooded area one can also do some light thinning or improvement cutting, which consists of removing all growth interfering with vigorously growing specimen trees or with trees of greater value from an æsthetic point of view. One can also take the young shoots growing out of oak stumps or of stumps of other

desirable species and by cutting off a few of the poorer shoots the better ones can be encouraged to grow more vigorously and straighter.

5. The egg masses of the tussock moth and similar insect pests can be removed and burnt to advantage in this month. Some of these egg masses contain from twenty-five to four hundred eggs and the destruction of a single egg mass means the prevention of that many caterpillars during the following summer. Do not drop these eggs and cocoons on the ground because they will hatch there in the spring just as well as they would on the trees.

6. Look over your tools, ladders, spraying apparatus, hose and rope and do the necessary repairs before the active work time of spring comes.

QUESTIONS AND ANSWERS

Q. My neighbor uses arsenate of lead for spraying. Will you please tell me what arsenate of lead is composed of, when and how to use it and how I can make it?

J. L. B., Mt. Vernon, New York.

A. Arsenate of lead is a chemical appearing on the market in either paste or powder form and is used in solution with water as a spray against all leaf-eating insects, such as caterpillars, elm leaf beetle, etc. It is generally used in a mixture of water at the

rate of one pound to 10 or 15 gallons of water. By spraying the leaves with it the leaf-eating insects feed on the poisoned leaves and become poisoned themselves. A chemical analysis of arsenate of lead shows the following constituents: Lead expressed as lead oxid about 30 per cent; arsenate expressed as arsenic oxid about thirteen and a half to sixteen per cent; soluble arsenic oxid about one-half of 1 per cent, and soluble impurities not over 3 per cent, and water not more than 50 per cent.

* Photographs by courtesy of Isaac Hicks & Sons.

Q. What steps shall I take to prevent fire on my woodland?

M. J. K., *Tarrytown, New York.*

A. Do not let any loose brush lie around. Put up posters warning trespassers not to drop lighted cigars, matches, etc. Place a tool box in some inconspicuous corner and have it filled with fire-fighting tools, such as old brooms, axes, iron rakes, etc. Have numerous paths through the woodland and keep these free from litter.

Q. When shall I prune my apple trees?

F. K., *Freehold, New Jersey.*

A. In March, though you may remove the dead branches at almost any other time.

Q. First. What is the scale of which I am sending specimens? Second. What is the best treatment for the tulip scale?

Third. Do you think the Norway maple would be successful in this locality? The *Ginkgo Biloba* (Japan Maiden Hair Tree)?

Fourth. What would you suggest for narrow paved street, also for suburban planting?

Fifth. Most of the elms here are in cramped paved streets, seem to go to pieces if allowed to grow large and spread (poor root work presumably) but pick up if heavily pruned. Do you advocate pruning heavily on such elms?

Sixth. Could you give or refer me to the damage or cost of control of the White Marked Tussock Moth in the New England States?

D. L. B., *Charleston, South Carolina.*

A. First. The specimen you have submitted is affected with *aspidiotus ancyclus*, and the remedy is to spray the affected parts with kerosene emulsion, one part to twenty parts of water, in the month of July, when the young insects emerge.

Second. The best treatment for the tulip scale is to scrape all the old insects from the branches in the fall and then spray or wash the infested limbs with kerosene emulsion, one part to ten parts of water.

Third. The Norway maple ought to grow, though not as vigorously as further north, in the vicinity of New York City. The ginkgo will do well.

Fourth. For planting in a narrow street, use ginkgo and Lombardy poplar, and for suburban planting use pin oaks, European and American linden, tulip tree, sweet gum, red maple, red oak, elm—both American and European.

Fifth. As to pruning if done at all, it should be done lightly at frequent periods, instead of resorting to heavy pruning. It is advisable to get at the roots and to encourage them with larger spacing in the sidewalk, better soil, manure and cultivating and watering. Where an elm must be pruned, the work is justified on the ground that an elm as much as most other species will stand pruning.

Sixth. The tussock moth will completely defoliate lindens, maples, etc., in early summer. Work of extermination consists in collecting and burning egg masses in fall and winter and spraying with arsenate of lead for caterpillars in June and early July. The average cost is from 18 cents to 25 cents per tree.

Q. I am writing for your advice about setting out several acres in white pine. Where can these trees be had to best advantage? At what intervals should they be planted with a view to making a dense screen, and how large would you advise setting them out so that they would grow to advantage? Would you suggest any other variety for the purpose indicated? Rapidity of growth and a screen the year around are the principal desiderata. I should greatly appreciate the fullest information you can give me in the premises, prices, number to the acre, etc.

E. G. B., *Dover, Delaware.*

A. With regard to your contemplated planting, I would not wish to recommend for your purpose the white pine, because of the very serious danger which threatens in the shape of the blister rust. Though the disease has not appeared as yet in Delaware, it is in New Jersey and other states close by. Besides the loblolly pine or Norway spruce would be just as good, if not better, for your purpose, in view of the fact that you desire quick growers to make a dense screen all the year round. Would suggest that you plant these in three or four rows and about ten feet apart, alternating the placing of the trees in each row so that in every other row the trees will stand opposite each other. I would not recommend your purchasing larger than four-year-old transplants, as they would not only be very expensive, but these large trees sometimes take several years to start growing properly, during which time the younger ones would catch up with their growth, and you would stand so much better chance of a vigorous growth with this size. None of this applies if your land to be planted is damp or swampy, for you would have no success with these species. You can write with safety to any of the nurserymen advertising in AMERICAN FORESTRY and depend absolutely on information or stock they may send you.

Q. Let me know what you advise for spraying apple trees this month. Our farm in New Canaan, Connecticut, has about sixty old apple trees on it. We have sprayed for the past three years, using Scalecide, lime-sulphur and arsenate of lead. When we purchased the farm three years ago we were told that the trees were affected by scale. We think most of that is cured. The tent caterpillar was rather troublesome. The fruit was not as large or perfect this summer and I should like to know what you would advise.

J. E. W., *New York City.*

A. Replying to your inquiry, spray in the fall or early spring, before the buds open, with lime sulphur wash for scale insects. It is good practice to spray once a year with lime sulphur, no matter whether the trees are badly infested with scale or not. The arsenate of lead is only useful against leaf-eating insects such as tent caterpillars. Apply the mixture in early summer, when the leaves are out and in danger of being eaten. To increase the production of fruit, prune the branches in the fall, root-prune in early spring, and fertilize with well rotted manure. If you follow these suggestions you will be well pleased with your results.

Q. I have recently transplanted an American Holly. The work was well done, the tree being moved with a large unbroken ball and few roots exposed. The tree is about 12 feet high and a very good specimen. Some of the supposed experts here tell me I should strip it of its leaves if I wish it to do well. Please let me know what you think necessary to insure successful growth. I have also moved some very large boxes—bush variety.

J. S. F., *Baltimore, Maryland.*

A. As to transplanting your holly I would not feel that it is necessary to strip the tree of its leaves, though this is very often done. Would advise, however, that you mulch both the holly and the box heavily with leaf mold and some well rotted manure, and also that you protect them, at least for the first winter, with a covering of thin canvas or boughs of evergreen trees. I am sure that with the precautions taken in your transplanting operations, you will have success with them.

DURING the fiscal year 1916, 705,872 acres of National Forest timberlands were estimated and mapped intensively, and 1,093,006 extensively. In all, 20,815,798 acres have been mapped by intensive methods and 47,291,660 by extensive methods.

THE FIGHT AGAINST THE PINE BLISTER DISEASE

Congress and States to Be Asked for Appropriations and for Authority to Enforce Stringent Quarantine Regulations.—The Situation in the Various States and an Outline of What Should Be Done in the Campaign Against the Disease

THE fight against the blister disease which threatens to exterminate the white and other five-leaved pines of the United States and Canada is steadily progressing.

A bill is to be presented to Congress asking for \$500,000 for the Department of Agriculture to use in investigation, scouting, and in coöperation with the states, in determining the presence of and in eradicating the disease.

Another bill will ask that Congress give the Federal Horticultural Board authority to declare a quarantine in any state or district where the members deem such a quarantine is necessary to prevent infection.

Massachusetts is asking its State Legislature for \$60,000 to fight the disease and other states are preparing to demand appropriations and to authorize quarantines.

The American Forestry Association is conducting a nation-wide publicity campaign to acquaint the people with the dangers of the blister disease and with the necessity for immediate action in the effort to retard its progress and if possible to stamp it out.

Governors of various states and of provinces of Canada have appointed delegations to attend the International Forestry Conference at Washington, D. C., January 18 and 19, on the occasion of the thirty-seventh annual meeting of the American Forestry Association, to discuss measures for combating the disease; many coöperating organizations have also appointed delegates to attend this meeting, and members of the Association and kindred organizations from all sections of North America will be present.

Following the addresses, discussions and conferences there will be immediate national and state legislative activity in the endeavor to secure the passage of the necessary appropriation and quarantine bills. Officials of various states where the infection has been found are now preparing bills for submission to the legislatures, many of which convene in January, while in other states where no

infection has appeared, but where there is a growth of white or five-leaved pine which may be infected, state officials are preparing to take the necessary steps to give authority for such quarantine regulations as are needed under the circumstances.

A general résumé of the introduction of the disease into this country, its spread, the present situation, and the needs for the future are here given:

The white pine blister disease has made impracticable the growing of the American white pine in Denmark, Holland, and England, and has seriously interfered with its culture in Germany. All the five-leaf pines of the United States have been shown to be susceptible to the disease, and the conditions favorable for its spread have been found in all regions where these pines grow. Although no personal investigation has been made in Europe by the United States Department

of Agriculture, indications are strong that American conditions, particularly climate, and currant and gooseberry hosts, are more favorable to the disease than conditions in Europe. The disease has already become a very serious menace in one of the three great white pine regions in the United States. The white pines, because of their wide distribution, the proportion and high values of their woods, their rapid growth, merchantability at an early age, resistance to brown-tail and gypsy moth, and ability to thrive on poor soils and under adverse conditions, are among our most valuable forest trees, considering both present conditions and the possibility of future production.

Two years ago the disease was known to be present only in very restricted localities, where it had been introduced directly on European nursery stock, mostly from Germany. It has spread rapidly.

In Maine five infected plantings and one infected nursery have been located; in every case the disease has spread to native pine. On currants and gooseberries the disease is generally distributed

WHAT HAS BEEN DONE TO FIGHT THE PINE BLISTER DISEASE

1. A Federal quarantine against the importation of white pine from Europe was established in 1912, and last year the Federal Horticultural Board requested nurserymen in the East not to ship white pine, currants, or gooseberries west of North and South Dakota, Nebraska, Kansas, Oklahoma, and Texas. This request is known to have been disregarded in at least ten cases. Canadian white pine stock was excluded last winter. A limited number of states have also established quarantines against the importation of white pine stock from outside states.

2. A considerable amount of publicity has been given by Federal and State agencies, the American Forestry Association, and other associations to the prevalence and spread of the disease and its possible results.

3. A large amount of scouting has been done by Federal and State agencies within the areas of possible infection.

4. A large amount of eradication of diseased currant and gooseberry bushes and white pine has been done in the New England states, but much remains to be done. Complete eradication east of the Hudson River is probably not possible. West of the Hudson River practically all of the infections found have been destroyed.

5. The Forest Service last year, after learning of the seriousness of the situation, prohibited the use within the National Forests of white pine and currant and gooseberry stock from Eastern nurseries.

throughout the white pine section of the State.

In New Hampshire infected pine was found in four plantings and infected currants and gooseberries in sixty-nine out of the one hundred and nineteen towns scouted (57 per cent); three nurseries contained infected currants and gooseberries.

In Vermont infected currants and gooseberries, particularly black currant, were found in nearly every section of the State visited during 1916: infected pines were found in ten plantations.

Massachusetts is by far the most seriously infected State. This is well explained by the fact that importation of pine nursery stock from Europe was continued on a large scale and with official encouragement until 1912, or for three years after the state authorities were warned of the danger by the United States Department of Agriculture and by the action of neighboring states. Forty-nine infected plantings have been found. In eight localities the disease has spread to native pines. Currants and gooseberries are generally infected in the eastern and western thirds of the states, scattering infections occur in the central third.

In Rhode Island there is one infected pine plantation near Newport, and scattered infections of currants exist throughout the state.

In Connecticut, out of thirty plantations and sixteen nurseries inspected, the disease was found in ten plantations and one nursery. In northwestern Connecticut the disease has spread from an infected plantation to native pines and covers an area of about 40 square miles on currants and gooseberries. Scattered

WHAT SHOULD BE DONE BY THE U. S. DEPARTMENT OF AGRICULTURE TO FIGHT THE PINE BLISTER DISEASE

1. Immediate Federal quarantines of the infected states or parts of states to prevent, if possible, the further spread of the serious conditions existing east of the Hudson River to the Lake states and other parts of the eastern white pine region now but slightly infected, and to exclude the disease from the Inland Empire and California. Authority for the necessary action rests with the Federal Horticultural Board, which has had the matter under consideration for more than a year.

2. It is fundamentally important that the country west of the Mississippi, in which the disease is not now known to exist, be protected. If the above quarantine cannot be declared, then Congressional action should be secured, prohibiting the shipment of five-leaf pines or currants and gooseberries from East to West across the Mississippi Valley.

3. Greater efforts should be made to educate the public regarding the seriousness of the situation and to arouse public opinion and force action and adequate legislation to independent states. Inadequate power on the part of many states to eradicate the disease when located is by far the most serious handicap to fight.

4. The strengthening of the police power of the Department to the limit of Congressional authority, if this has not already been done, with the appropriations to make it effective, or if Department authority cannot be made effective, authority to cooperate fully with the states. These powers should be used in experiments to determine the practicability of wholesale eradication of currants and gooseberries, locating infected areas, eradicating isolated infections, and as a minimum holding serious infections within their present boundaries.

cases of infected currants and gooseberries were found in sixty-five of the one hundred and ten towns scouted.

East of the Hudson River in New York there are two large infections of native pine with general infection of adjacent currants and gooseberries in Essex County, two infected plantings, and three nurseries containing diseased pine. Currant and gooseberry infection is general in Columbia County, having spread from Massachusetts.

It is then obvious that east of the Hudson River infection is so general that white pine growing will only be possible in areas which can be freed from all currant and gooseberry plants and kept free permanently.

Infections west of the Hudson River are not known to be so serious. West of the Hudson River in New York eight infected plantings were found, three nurseries with infected pine, and six nurseries with infected currants and gooseberries. Infected currants and gooseberries were found in forty-two other localities, mostly near Geneva and in Niagara County. In no place can the disease be considered to be beyond control

by the eradication methods now in use.

In New Jersey infected white pine has been found in four nurseries and in two plantings and diseased currants and gooseberries in one nursery and one estate.

In Pennsylvania infected pine was found in two nurseries and in three plantings.

No infections have been found in Delaware, Maryland, Virginia, North Carolina, Kentucky, Tennessee, West Virginia, Michigan, Illinois, or Indiana.

WHAT THE PINE BLISTER DISEASE INVOLVES FROM THE STANDPOINT OF FORESTRY AND LUMBERING

1. Present merchantable timber values aggregating around \$275,000,000, a part of which are threatened.
2. Present values of immature timber practically impossible to appraise and a part of which has been planted artificially, which in the East are seriously threatened.
3. Nursery stock and investments, Federal, State, and private.
4. Possibility of future production of the most valuable trees in several regions of from two and a half to nine billion feet annually seriously threatened. This means the highest use of from 30 to 40 million acres of comparatively poor lands which otherwise would be used less advantageously or not at all, the support of a local population, local lumber and wood manufacturing industries, and of many allied industries, local and otherwise.

Infected white pine was found in one nursery in northeastern Ohio.

In Minnesota four infections, and in Wisconsin two infections, have been found along the St. Croix River, with the possibility of infection in an area about forty miles square.

Considerable infection has been located in the lower Ontario

peninsula of Canada, but the Canadian authorities appear to have this situation well under control. An infection of unknown extent has been located very recently near Montreal.

In the territory west of the Mississippi River, a general search has been made for the blister disease, following obvious clues of shipments of pine, currants and gooseberries. The disease has not been found. There is no natural way in which the disease can spread into this territory, *i.e.*, it can only come in on nursery stock. The danger of its introduction on nursery stock is, however, as great as it ever was.

IMPORTANCE IN TIMBER PRODUCTION

There are about 13 billion feet of merchantable white pine in the Northeast, worth in the neighborhood of \$75,000,000. The development of private forestry, largely through the presence of the eastern white pine, has gone further in this region than in any other part of the United States. The area planted to white pine is conservatively 50,000 acres, and 10,000,000 seedlings are probably planted each year. Within this region there are



PINE BLISTER INVESTIGATORS

Representatives of practically all the states in the white pine belt, of Canadian provinces, of the United States Department of Agriculture and of the American Forestry Association and state forestry associations met at Albany, New York, recently to report upon the extent of the pine blister outbreak and to discuss ways of combating it.

5,000,000 or nearer 10,000,000 acres more suitable for the production of forest trees than for any other purpose, in which the white pine was an important tree in the original stand and in which it will undoubtedly be the best individual tree for future use. If the blister rust is not or cannot be suppressed, it seriously threatens the elimination of

the white pine as a forest tree of economic value in this region.

There are still in the lake states in the neighborhood of twelve billion feet of merchantable white pine, worth probably \$96,000,000. There are probably 2,000,000 acres or more of young growth in which a considerable percentage of the stand is white pine. At least 3500 acres have been planted. In addition to private and state nurseries the Federal Government maintains others with an output of from 400,000 to 500,000 seedlings annually. At least 5,000,000 and probably nearer 10,000,000 acres in the lake states are undoubtedly more valuable for the production of timber than for any other purpose. White pine was the important tree of the original stand and it should be for future production.

Under forest management,

if the blister disease is kept out, an area now largely unproductive could be made to produce annually from one to four billion feet of the valuable white pine.

Private holdings of western white pine in the Inland Empire amount to about twenty billion feet and Federal holdings to about ten billion. The timber on the average



PINE INFECTED WITH BLISTER

Four-year white pine tree diseased with white pine blister disease. Badly swollen but not yet showing fruiting bodies of the parasite.

is worth from \$2.50 to \$3 per M. A Forest Service nursery in western Montana now produces about two and one-half million seedlings of western white pine annually, and the Service has already planted and seeded at least 8000 acres. Merchantable western white pine is found over an area of about 27,500,000 acres. It forms an important percentage of the stand over 5,000,000 acres. From 2,000,000 to 3,000,000 acres bear young growth. Present annual growth equals about 150 million feet and this under continued management could easily be doubled. Selected acres show a production of 100,000 feet per acre in 120 years. The tree occurs largely in a mountainous region where if the blister disease were once established its control would be exceedingly difficult and costly, if not impossible.

The sugar pine of California occurs as a merchantable tree over about 20,000,000 acres, and forms an important percentage of the stand within about 3,000,000 acres. It should be found permanently in forest mixtures on about 10,000,000 acres. There are about 14 billion feet of sugar pine on the National forests and 20 billion in private holdings, worth on the average about \$3. The present

annual growth of sugar pine is about 100 million feet, and this can be considerably increased under management. Sugar pine, like the western white pine, occurs in a mountainous, inaccessible country.

This is the situation reduced to cold facts. The task of preventing the further spread of the disease is now up to the National Government, the State Governments, and the people. It may already be too late to save the pines.

Little attention was given the chestnut blight when it first appeared. Later when its danger was realized hundreds of thousands of dollars were spent in an effort to overcome it. That failed. More money was spent in the effort

to confine it to certain areas. It was too late. That failed also—and now we can consider our chestnuts as doomed.

Is it too late to save the pines? That, the future alone can answer. It is not too early to try to suppress it, to stamp it out, if possible, and, at any rate, to retard its progress or to confine it to areas where it is already apparent. But if action is to be taken, it should be taken at once. There should be no delay. Action prompt, vigorous, and far reaching is desired.



PUBLICITY ON THE PINE BLISTER DISEASE CAMPAIGN

The battle to arouse public sentiment as to the importance of checking the spread of the pine blister disease has been started on a country wide basis by the American Forestry Association with the establishment of a publicity bureau. This department collects data from every state in the Union and in Canada and keeps the newspapers informed. Every Washington correspondent of a newspaper, the Associated Press, the United Press Association and the International News Service, with their daily papers aggregating 10,000 clients, are served with regular news bulletins dealing with developments in the various states. The copy is written on stencils and then put on a machine, so anywhere from a dozen to a thousand copies of a "story" may be run off in a short time. Russell T. Edwards has been placed in charge of the publicity work with a corps of assistants.

MEMBERS OF THE COMMITTEE OF SUPPRESSION

The Committee for the Suppression of the Pine Blister Disease of North America comprises the following:

ARIZONA—A. W. Morrill, State Entomologist, Phoenix; E. P. Taylor, Tucson.
 CALIFORNIA—G. M. Homans, State Forester, Sacramento; E. O. Essig, University of California, Berkeley.
 CANADA—Dr. C. Gordon Hewitt, Dominion Entomologist, Ottawa; G. C. Piché, Chief of the Forest Service, Quebec; Clyde Leavitt, Forester, Commission of Conservation, Quebec.
 COLORADO—W. J. Morrill, State Forester, Fort Collins; C. P. Gillette, State Entomologist, Fort Collins.
 CONNECTICUT—W. O. Filley, State Forester, New Haven; Dr. W. E. Britton, State Entomologist, New Haven; Prof. J. W. Toumey, Director, Yale Forest School, New Haven; Dr. G. P. Clinton, New Haven.
 DELAWARE—Wesley Webb, State Board of Agriculture, Dover.
 ILLINOIS—E. A. Sterling, Mgr. Trade Extension Division, and R. S. Kellogg, Secretary Natl. Lumber Mfrs. Assn., Chicago; Stephen A. Forbes, Entomologist, Urbana.
 INDIANA—Frank N. Wallace, State Entomologist, Indianapolis; E. A. Gladden, Secretary, State Board of Forestry, Indianapolis.
 IOWA—R. L. Webster, Acting State Entomologist, Ames.
 KENTUCKY—H. Garmon, Agricultural Experiment Station, Lexington; J. E. Barton, State Forester, Frankfort.
 MAINE—Frank E. Mace, Forest Commissioner, Augusta; Prof. John M. Briscoe, University of Maine, Orono; E. E. Ring, Bangor.
 MARYLAND—Thomas B. Symmes, Director, Maryland State College of Agriculture, College Park; F. W. Besley, State Forester, Baltimore.
 MASSACHUSETTS—Wilfred Wheeler, State House, Boston; Harris A. Reynolds, Sec., Massachusetts Forestry Assn., Boston; F. W. Kane, State Forester, State House, Boston; William P. Wharton, Groton.
 MICHIGAN—A. C. Carton, Secretary, Public Domain Commission, Lansing; L. R. Taft, State Board of Agriculture, East Lansing.

MINNESOTA—W. T. Cox, State Forester, Saint Paul; F. L. Washburn, State Entomologist, St. Anthony Park; E. M. Freeman, Plant Pathologist, St. Paul.
 MONTANA—John C. Van Hook, State Forester, Helena; M. L. Dean, State Horticulturist, Missoula.
 NEW HAMPSHIRE—E. C. Hirst, State Forester, Concord; Philip W. Ayers, Forester, Society for the Protection of N. H. Forests; Prof. O. R. Butler, Botanist, N. H. College, Durham; Prof. W. C. O'Kane, Entomologist, Durham.
 NEW JERSEY—Harry D. Weiss, Chief Nursery Inspector, New Brunswick; Mel. T. Cook, Plant Pathologist, Agricultural Exp. Station, New Brunswick.
 NEW YORK—C. R. Pettis, Conservation Commission, Albany; Prof. George G. Atwood, Chief, Bureau Plant Industry, Albany; Victor A. Beede, Secretary, New York State Forestry Assn., Syracuse.
 NORTH CAROLINA—J. S. Holmes, State Forester, Chapel Hill; Franklin Sherman, Jr., Entomologist, Raleigh.
 OHIO—N. E. Shaw, Chief Bureau of Horticulture, Columbus; Edmund Secrest, Forester, Wooster; A. D. Selby, Botanist, Agricultural Exp. Station, Wooster.
 OREGON—F. A. Elliott, State Forester, Salem.
 PENNSYLVANIA—J. G. Sanders, State Entomologist, Harrisburg; Robert S. Conklin, Commissioner of Forestry, Harrisburg.
 RHODE ISLAND—Jesse B. Mowry, Chepachet; Prof. H. H. York, Brown University, Providence; Dr. A. E. Stene, Entomologist, Providence.
 SOUTH DAKOTA—George W. Roskie, State Forester, Custer.
 TENNESSEE—R. S. Maddox, Forester, Nashville.
 VERMONT—A. F. Hawes, State Forester, Burlington.
 VIRGINIA—A. C. Jones, State Forester, Charlottesville; W. J. Schoene, Entomologist, Blacksburg.
 WEST VIRGINIA—A. B. Brooks, Forester, West Virginia University, Morgantown; J. A. Viquesney, Forest, Game and Fish Warden, Belington.
 WISCONSIN—L. R. Jones, Professor of Plant Pathology, Madison; F. B. Moody, Commissioner, Madison.
 American Forestry Association—Charles Lathrop Pack, Lakewood, N. J.

WATER-POWER ON NATIONAL FORESTS

IN the fiscal year 1916, says Henry S. Graves, Chief of the Forest Service, in his annual report, twenty new water-power projects which utilize National Forest land began operation. This was an increase of eighteen

Concerning the report prepared by the Forest Service in response to a resolution of the Senate calling upon the Secretary of Agriculture for information regarding the ownership and control of water-power sites and any facts bearing

on the question as to the existence of a monopoly in the ownership and control of hydroelectric power in the United States, Mr. Graves says: "This report presented in far greater detail than has ever been attempted before, an exhaustive analysis of the general power situation. It showed a marked concentration of definite and complete control of a large percentage of developed water power by a very few companies. Data presented regarding interrelationships through common directors and principal officers indicated a marked tendency toward association or community of interests, particularly between the principal holding companies. The movement toward concentration in commercial central stations of all the primary power employed in the electrical industries and in manufactures was found in all sections of the United States, the



POWER HOUSE NO. 2, PACIFIC LIGHT & POWER CORPORATION

This plant has an installation of 47,000 horsepower which will eventually be increased to 94,000. This and another power house of the same size and owned by the same company are on the Sierra National Forest, California. They are the first units in an ultimate development of about 250,000 horsepower, all on the Sierra National Forest, constructed and operating under a revocable permit issued by the Secretary of Agriculture on July 16, 1913

and one-half per cent in the total number. In the fiscal year 1915 the number of new projects which began operation was twelve. Forty-two per cent of the total developed water-power of the United States utilize National Forest land, the Forest Service figures show.

Development of relatively small projects is particularly in evidence, according to Mr. Graves, in the Rocky Mountain States. California leads in the amount of power under permit and in operation. The number of transmission line permits in effect was increased by thirteen during the year. The forty applications for power-project permits received in 1916 included eight from Alaska—a notable evidence, according to the report, of increased local interest in power development on National Forest lands there.



A POWER HOUSE ON THE INYO NATIONAL FOREST

This is the No. 6 power house of the Nevada-California Power Company on Bishop Creek, Inyo National Forest, California

rate of concentration during the period 1902-1912 being highest in the South Atlantic States and the extent of concentration greatest in the Western States.

"The rate of increase in water-power development for publicservice use from 1902 to 1912 was approximately three times as great as in steam power. Primary power installation from all sources and for all uses increased from 1902 to 1912 more than two and one-half times as rapidly in the eleven Western States as in the remainder of the United States, while the increase for primary electric power for the same period was 440 per cent for the Western States, as against 226 per cent in the other States. The development per capita of the Western States in 1912 was two and one-half times as great as in other parts of the country.

"The report showed a considerable over-development in nearly all the power centers of the Western States—California, Oregon, and Washington in particular showing installations far in excess of maximum demands."

SAVING A FAMOUS TREE

JAMES DEERING, of 606 Michigan Avenue, Chicago, has come to the rescue of a tree and as a result the famous old wild fig of Miami, Florida, has a new resting place. This is on the Deering estate at Cocoanut Grove, Florida, which is one of the most beautiful in the country. The attention of AMERICAN FORESTRY was called to the tree by Mrs. Francis Hall Murdoch of the



FAMOUS OLD WILD FIG TREE

This tree at Miami, Florida, an old Seminole Indian landmark, was about to be destroyed when James Deering, of Chicago, paid \$500 to have it removed to his estate at Cocoanut Grove and there preserved.

Hotel Schenley, Pittsburgh, who told how it was about to be cut down to make way for improvements despite all the many interesting old Seminole Indian legends that include the tree in their lore.

A contractor told Mr. Deering that for \$500 he could move the tree and guarantee that it would live, so Mr.

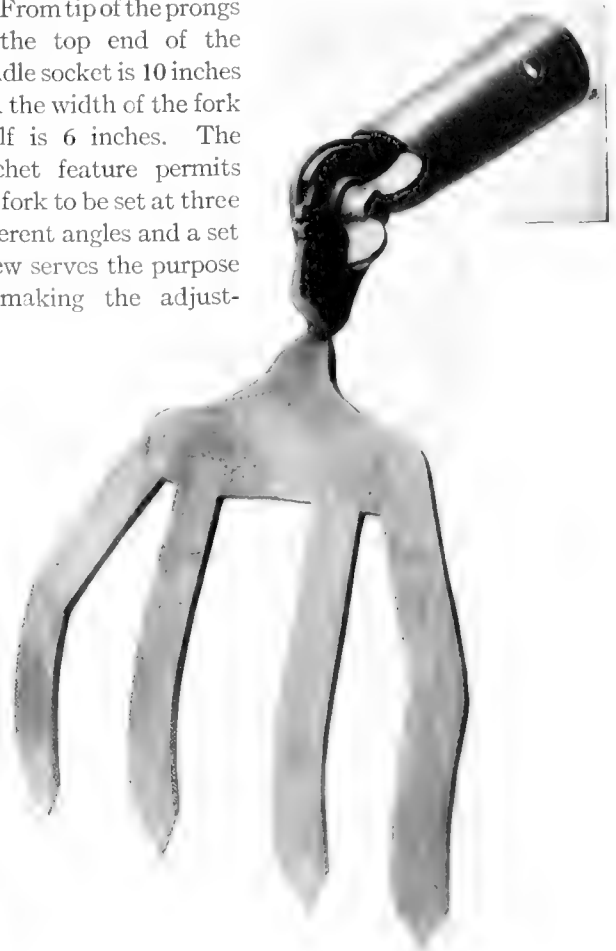
Deering ordered the removal. The tree has a place of honor on the magnificent grounds being laid out by the Chicagoan.

The estate in the Cocoanut Grove district will be very hard to excell, Mrs. Murdoch writes, as eight hundred men have been at work clearing the grounds and making the improvements. She particularly commends Mr. Deering for not erecting walls eighteen feet high and thus keep the public from enjoying the view.

A FOREST FIRE FORK

THE accompanying picture is that of a fire fork designed by John L. Strobeck, district forester of Pennsylvania for the purpose of being carried conveniently as a handy tool for forest fire fighting.

From tip of the prongs to the top end of the handle socket is 10 inches and the width of the fork itself is 6 inches. The ratchet feature permits the fork to be set at three different angles and a set screw serves the purpose of making the adjust-



ments secure. This fork has been tried out in actual service, and its parts are so proportioned as to give it working balance.

When it is needed, the user cuts a stick for a handle and inserts it in the socket. A nail kept handy may be driven through the hole in the socket into the handle to fasten same,

It may be taken apart and carried in the pocket, or still better, in a small case made to fit the pocket.

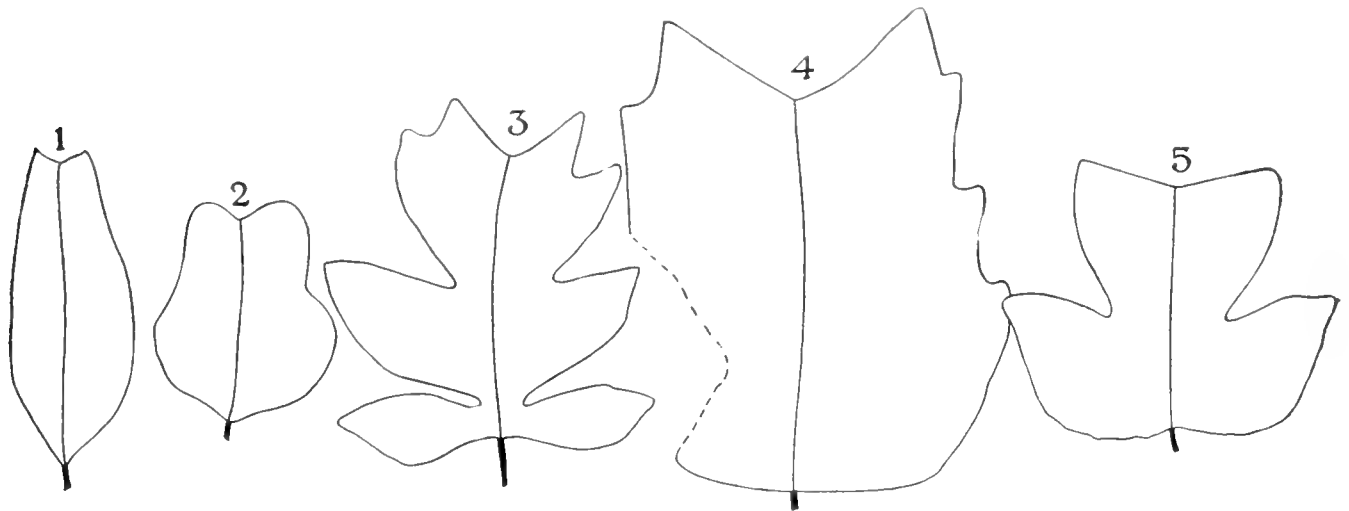
At its various angles, it may be used to rake leaves, to keep the fire lane clear of debris, or for any purpose which is served ordinarily by the naked hand. Leaves do not accumulate on the fork owing to the shape and width of the prongs.

THE PEDIGREE OF A SPLENDID TREE

IF "blood tells" in human beings, and in the lower animals as well, why should not pedigree count in the vegetable world also?

Take the yellow poplar for an example. This is the finest hardwood tree in the world, if judged by size, form, foliage, bloom, and the wide range of uses in which its wood is employed. In girth of trunk it may not equal the largest hollow sycamores; but it overtops in height all its competitors among American hardwoods; and in grace of form, and in yield of excellent lumber, no hardwood of this country equals it. The oak, which is justly called king of hardwoods, if the utilization of its wood is alone considered, must take a back seat when size of trunk

cretaceous age. It was after the coal beds were formed, but before the ice age. Coal was formed of palms, ferns, and the like, in vast swamps, as is supposed; but after that the land became dry, and it was then that the hardwoods made their appearance, and formed forests surpassing anything known on earth today. There are about five hundred kinds of trees in America north of Mexico now. The number was double some millions of years ago. The magnificent forests of that remote time seem to have sprung into existence all at once. The records in the form of leaf prints in the rocks show no gradual and slow development; but the forest's full and wonderful richness came suddenly.



YELLOW POPLAR LEAVES OF VARIOUS GEOLOGICAL PERIODS

1—Willow-leaf poplar five million years ago; 2—Fiddle-leaf poplar four million years ago; 3—Oak-leaf poplar three million years ago; 4—Giant-leaf poplar a million years ago; 5—Yellow poplar leaf of the present time.

is considered and comparison is made with yellow poplar.

There is ancestry back of this splendid tree. No royal house among the kings of earth has anything to compare with it, not even Menelik of Abyssinia who traces his line back to Solomon. When the first white men settled in the United States they made the acquaintance of yellow poplar. They never heard of it before, because it did not grow in Europe. The Virginia Indians called it "vikiok" and made canoes of it.

History goes no farther back than that in its account of the yellow poplar; but that is really the last page of this tree's voluminous and romantic history. Talk of the survival of the fittest. Here is an example of it. Geologists and palæobotanists (those who study fossil botany) are the yellow poplar's biographers. They have dug its life history out of rocks and clays where its leaves and flowers have lain buried during thousands and millions of years. This tree was in America at a time so remote that in comparison with it, the period covered by human history is as a hand's span to the distance round the world.

The records of geology show that yellow poplar made its appearance on earth during what is known as the

Among the earliest of the hardwoods in those forests was yellow poplar—not one solitary species as at present, but sixteen of them, every species apparently being as fine as ours of today, or finer. The climate was warm, and trees which now grow no further north than the United States, then flourished in Greenland. Yellow poplar was in that remote northern land, and its companions were sassafras, red gum, sycamore, bald cypress, and the "big tree" now confined to California. At that remote time yellow poplar grew in Europe where it no longer exists.

The sixteen species which once flourished in America have dwindled to one. Fifteen species perished in a tremendous catastrophe which changed the face of much of the northern hemisphere. It was a winter a million years long, known as the Ice Age. The ice killed every living plant in its path. It pushed from the north down to middle United States, burying everything. A single species of yellow poplar escaped, and that one is with us yet. It was probably growing at that time south of the region of extreme cold, and thus managed to survive, and when the ice sheet finally melted away, the yellow poplar worked its way north again, and reached the southern provinces of Canada. Some of its former companions,

notably red gum, bald cypress and "big tree," never succeeded in working their way again as far north as Canada; while the yellow poplar and the California big tree parted company during the Ice Age, never to meet again.

The apex of the yellow poplar leaf has a characteristic notch. The shapes of the leaves of all the species from the earliest till the present, have varied greatly, but the notch has always been there. Among the earliest poplar leaves were some shaped like a peach leaf, except for the notch. Then came the form like a "fiddle," but still the notch was in evidence. There was one which looked somewhat like an oak leaf, with the notch present. Changes followed until the present form was developed.

—*Hardwood Record.*

THE 640-ACRE STOCK-RAISING HOMESTEAD LAW

THE 640-acre Stock-Raising Homestead Law is now in force, having been approved by the President on December 29, 1916. All qualified homestead entrymen may share in its benefits. The law requires the Secretary of the Interior to designate the lands as "stock-raising lands" before they may be entered, and he can designate only such lands "the surface of which is in his opinion chiefly valuable for grazing and raising forage crops, do not contain merchantable timber, are not susceptible of irrigation from any known source of water supply, and are of such character that 640 acres are reasonably required for the support of a family. "This means that of necessity a classification of the lands will be made before they are opened to entry. The lands which are to be designated are those upon which it is possible to raise forage crops other than grasses naturally growing upon them, and upon which an entryman may reasonably expect to support his family upon 640 acres. Undoubtedly a portion of the remaining public lands is of the character contemplated by this act and will pass into the hands of settlers under its provisions.

To acquire title to a homestead under this act, an entryman must reside upon the land not less than 3 years and make permanent improvements thereon, tending to increase its value for stock-raising purposes not less than \$1.25 per acre, one-half of which must be placed on the land within 3 years after the date of entry. Cultivation of the land, except so far as this may be necessary to raise forage crops, is not required. Commutation of entry is not allowed. Applications accompanied by affidavits as to the character of the land may be filed in the local land offices and this will give the applicant a preferential right of entry in case the land applied for is designated, but occupancy of the land is not allowed until after it has been classified and designated by the Secretary of the Interior for entry under this law.

Where a homestead entry has already been made upon lands of the character described in this act, additional lands of the same character may be taken in such quantity as will not increase the total holding to more than 640 acres, provided the additional lands are located not more than 20 miles from the original entry. Provision is made

in the bill for withholding waterholes needed to insure public use of the remaining grazing lands and for the withdrawal of driveways needed in the movement of stock between summer and winter ranges and to and from shipping points.

When the lands suitable for entry under this act have been designated there will still remain a large portion of the public grazing lands which are not of sufficiently good character to be suitable for entry as 640-acre homesteads. Some provision should be made under which the remaining grazing lands can be protected and improved and their use for grazing purposes controlled. This could best be accomplished by the application of a plan similar to that which has been worked out for the management of grazing on the National Forests, with such modifications as may be necessary to meet the conditions in different localities. Investigations by experts of the Department of Agriculture into the production of meat on the western ranges and the possibilities of increasing the number of meat producing animals on them have developed the fact that in general the original value of these lands has been gradually decreased through unregulated grazing, and that, in their judgment, with proper supervision and control these lands could be so improved within a reasonably short time as to carry approximately 30 per cent more stock than at the present time. The conservation of the public grazing lands demands that additional legislation for the accomplishment of this purpose should be enacted at an early date.

STATE REFORESTATION

A DEFINITE legislative program was formulated at the third logged-off land conference in Seattle, says the *West Coast Lumberman*. At this conference bills relating specifically to the handling of logged-off lands were read. J. T. Condon, dean of the University of Washington Law School, and chairman of the committee on the country unit plan for land clearing, read the bill drafted by the committee to be introduced in the state legislature at the next session. Another bill was read by Hugo Winkewerder, dean of the Forestry School of the University of Washington, who is chairman of the committee on reforestation. This bill has to do with the purchase by the state for reforestation of forest lands or logged-off lands.

TREES WITH A HISTORY

IS there a tree with a history in your town? What do you know about it? Is it being cared for or is it being allowed to die? AMERICAN FORESTRY would like to know about such trees and would be glad to receive pictures and articles, not to exceed 100 words about such trees. Such as are available will be printed in the magazine from time to time.

INTERNATIONAL FORESTRY CONFERENCE AND ANNUAL MEETING OF THE ASSOCIATION

INDICATIONS are that the Thirty-seventh Annual Meeting of the American Forestry Association and the International Forestry Conference to be held at the New Willard Hotel, Washington, D. C., January 18th and 19th will be one of the best attended forestry gatherings ever held in this country.

Governors of almost all the states, and officials of affiliated and coöperating organizations have appointed delegates to attend the conferences and many members of the American Forestry Association have signified their intention of being present.

The conferences will be busy ones. The subjects to be discussed are of nationwide importance. Almost every state in the Union has a direct interest in the proceedings, while the Association has grown to such a size that its deliberations and its actions are of great importance in public opinion.

President Charles Lathrop Pack has emphasized the importance of the meeting in his statements regarding the pine blister disease and the danger which it threatens and the members of the Association are very much alive to the necessity for prompt action in regard to efforts to stamp it out where it has appeared and to prevent it spreading to sections adjoining those infected.

Governor Whitman, of New York, at a conference of governors in Washington, D. C., in the latter part of December, called the attention of the state executives to the conference planned by the American Forestry Association, spoke of the need of a vigorous fight against the pine blister and urged the executives to send state delegations to take part in the discussion of ways and means for stamping out the disease and enlisted the assistance of the governors in the campaign being waged against it.

This subject will be discussed by some of the leading experts, men who have made a close study of the disease, and of the measures which should be taken to prevent its spread.

The addresses on public playgrounds on the National Forests, and public uses of the National Parks and the conservation of game in the National Forests and National Parks are all of unusual interest and will attract a large number who are specially interested in these subjects while the information which they give will be of particular service to the members of the Association and to the general public.

A third subject affecting the whole nation is the discussion of the advisability of prohibiting the importation

of all tree and plant stock from other continents, except such as is permitted to enter for special purposes by the Department of Agriculture. Most of the tree and plant pests which have cost, and are costing, this country hundreds of millions of damage annually, were brought into this country on imported stock. There is every likelihood that such pests will continue to come into this country unless prevented by stringent quarantine regulations. The conference is to discuss the advisability of such regulations. It is a debatable subject. Can imported stock be so cleansed that the danger of these pests is removed? Can examination of stock for importation be so regulated that nothing suspected of being dangerous shall be permitted to enter this country? These are questions to be discussed. It is a big subject, an important subject.

There will meet at the Forestry Conference the Society of American Foresters for their annual business session; the Society of Eastern Foresters; and the Committee for the Suppression of the Pine

Blister Disease of North America which will have representatives from each state where the infection has appeared or is likely to appear.

The meetings will be held on the tenth floor of the New Willard Hotel, and delegates when they arrive will be requested to register there early on the morning of January 18. Detailed information may be had at the offices of the Association, 1410 H Street, Washington, D.C.

THE PROGRAM

JANUARY 18th, 10 a. m.

Annual Meeting American Forestry Association.

Address of the President.....CHARLES LATHROP PACK
Report of the Secretary.....PERCIVAL S. RIDSDALE
Address—"Economic Justice for Lumber and Forests".....E. A. STERLING, Director American Forestry Association.
Election of Officers and General Business.

JANUARY 18th, 2 p. m.

Recreational Uses of National Forests and National Parks.

Address—"National Parks as National Playgrounds".....STEPHEN T. MATHER, Assistant to the Secretary of the Interior.
Address—"Recreational Uses of the National Forests".....H. S. GRAVES, U. S. Forester.
Address—"Conservation of Game in National Forests and National Parks".....E. W. NELSON, Chief, U. S. Dept. of Biology.
Film Story—"National Forest Attractions".....C. J. BLANCHARD

JANUARY 18th, 8 p. m.

Meetings:
Board of Directors of the American Forestry Association.
Committee for Suppression of Pine Blister Disease.
Society of American Foresters.

JANUARY 19th, 9.30 a. m.

The White Pine Blister Disease.

Address—"What is the White Pine Blister Disease?".....DR. PERLEY SPAULDING
Address—"The Present Situation" { In New England.....W. P. WHARTON
Hudson to Mississippi.....E. A. STERLING
Pacific Coast.....E. T. ALLEN
In Canada.....CLYDE LEAVITT
Address—"What Shall We Do About the Disease?".....S. B. DEIWILER, U. S. Forest Pathologist.
Address—"Shall We Plant White Pine?".....C. R. PETTIS, Supt. of Forests of N. Y. State.
Address—"The Problem as a Whole".....DR. HAVEN METCALF, Chief of the U. S. Office of Forest Pathology.
Discussions and Resolutions.

JANUARY 19th, 2 p. m.

Stopping Importation of Tree and Plant Pests.

Address—"Losses Caused by Imported Tree and Plant Pests".....C. L. MARLATT, Chairman Federal Horticultural Board.
Address—"The Independence of American Nurseries".....DAVID T. FAIRCCHILD, Agricultural Explorer in charge of Office of Foreign Seed and Plant Introduction.
Address—"The Necessity for a Federal Quarantine Against all Trees and Plants".....J. G. SANDERS, Economic Zoologist of Pennsylvania
Discussions.

EDITORIAL

THE PERIL OF COMBINATIONS

THERE is a marked tendency in many states to revise or reorganize their state governments in an effort to secure greater efficiency and economy. This takes the form of consolidations of various departments into a single commission, and of substituting a single executive head for the board composed of several persons. It so happens that state forestry is nearly always affected by these proposed changes; and many state forestry organizations which have existed for years and built up creditable records for good work have faced, and will continue to meet efforts to bring about fundamental changes in their status, suggested by either newly elected executives with ambitious plans of reform, or by economy and efficiency commissions seeking new and apparently simpler machinery of government. The persistence with which these suggestions recur is based on a real desire for better government, but the effort, as applied to forestry, bids fair to defeat the very ends which it seeks to attain.

Forestry has sought and attained the same form of organization in many states as is used by educational institutions, and for the reason that the demands of the work for a trained forester have led to the creation of the office as a distinct position, requiring educational and technical training. In securing this very real executive, the benefits of the board idea have also been retained by providing, as in the case of university regents, that the Board shall appoint the forester, pass on his expenses, and have the general oversight and veto on his policies and personnel.

Under this plan, state foresters of real ability have been secured and have been retained for a series of years without the office becoming a political plum to be fought over at each election. Unless this system continues, it will be impossible to get results in forestry. Trees do not grow to maturity within the two-year terms accorded most of our governors.

The great point that needs emphasis is that the system of forestry boards, who appoint the state forester, has been entirely free from the weaknesses which have brought other boards into disfavor, and has shown by its results that it is an ideal form of organization. Then why should we seek to destroy this advantage, and are we fully awake to what we are doing?

It is claimed by some that the elimination of several boards, and the substitution of a single department, will cut down expenses. We can speak only for boards of forestry. These boards are not salaried. The persons serving on them give their time and interest to the work—and under the right form of organization this is not too much of a burden. No saving is effected by dispensing with these services.

The service of the executive will be required, as before, and the superimposing of some higher official over the

forester cannot possibly increase the latter's efficiency, and can result in economy only by cutting down his salary, or forcing him to work for less—which means a less able man to fill the place. The salary of the central executive is an additional expense, and is often considerable. The expense for clerical labor is not reduced, unless the work itself is curtailed. The forester, being himself an able executive, is capable of organizing and has already secured the best results from the force under his control, and the efficiency of this unit will not be increased by combining it with others.

Instead of improving the work, combinations of different bureaus under a single executive head infallibly tend to hamper forestry and retard its progress. The forester, on whose knowledge, interest and ability the entire work must rest, finds himself controlled by a superior whose interest is of necessity divided between the several lines of work for which he is accountable. Since it is almost impossible to find a person whose technical knowledge covers more than one line, the chief in all probability knows nothing of forestry, and is interested largely in fish and game, or agriculture. If he is indifferent, there is no appeal. Paralysis of initiative follows, and the forester becomes discouraged and either sinks to the position of a routine clerk, or resigns, to be replaced by some less able and enterprising man.

In some instances, these combinations are proposed as a means of obtaining political control of forestry work which has, by the merits of the system of state forestry boards, been kept free from the grasp of the spoilsman. Economy and efficiency in such cases form a convenient cloak to cover the real aim in view; which is to secure control of the office and of the field force, for political purposes. There can be no other object in deliberately upsetting an organization which is now giving complete satisfaction. A reform which seeks to tear down rather than build up, and which imposes changes of doubtful value on an organization already satisfactory to the public which it serves, should be viewed with suspicion. One of the most plausible arguments used to secure such combinations is that of avoiding the duplication of field agents. This applies especially to states which maintain a force of forest fire wardens, and an additional force of game wardens. The economy experts at once draw the conclusion that those two functions can be combined in the same person. Practical considerations point to just the opposite conclusion. In cities, it would be about as sensible to combine the jobs of fireman and policeman, as it would be to force the forest fire warden to assume the full responsibility for game protection. The time has not yet come when these two officials should be identified in the minds of the public. The game warden must inevitably make enemies in the course of his

duties. No simpler means of revenge exists than the setting of fires. The fire warden should be free from this handicap in an effort to build up public sentiment, especially in frontier communities most in need of fire protection. Where the duties of either office are exacting, one man cannot possibly do justice to both. Poachers would know only too well where the game warden was in case a fire occurred, and the fire warden could not be absent from his duties to attend to the arrest and trial of offenders against the game laws. Coöperation between fire and game wardens is practicable and desirable, but the actual combination of the functions of the two wardens in the same individuals has always failed, wherever tried, to give the best results. The economy and efficiency of combining game and fire wardens exists only on paper.

Not all state forestry boards have an ideal organization. In Indiana we have the anomalous condition of a board with no power to appoint or control the forester, who is a political appointee. In Wisconsin a three-headed commission exists, the forester and two others of equal rank and authority—an even worse form of organi-

zation than that existing in other states as it combines the worst feature of the board idea with that of the combination of departments. Boards might be appointed in such a way that they not only usurp executive functions, but regard the forester's office as a political job. But this has very seldom happened when the law requires that the forester be a technically qualified man.

Attempts recently made in both New Hampshire and Maryland to combine forestry with agriculture by a reorganization were wisely defeated on the basis that the existing form of organization was giving complete satisfaction.

Unless the people of a state, through their state forestry associations or in other ways keep close watch of their legislatures or in the coming sessions, similar attempts may succeed in states which have made an enviable reputation for efficiency in forestry. The sophistry of the arguments used to justify these dangers is not always apparent at first glance. The present system of forestry boards has been tested for over a decade and has shown itself to be sound. It is worthy of our united and sincere support.

NATIONAL PARKS VERSUS NATIONAL FORESTS

AFTER thirty years and more of comparative neglect, and haphazard management in the Interior Department, our National Parks have finally been placed by Congress under a definite administration bureau, with a chief and the nucleus of a consistent policy. Up to this time the parks have been the plaything of each succeeding secretary,—managed as separate units, with changing personnel, and no fixed plan except to provide in some way by concessions to private enterprise, for the accommodations demanded by the public.

National Forests first originated in 1891, and in 1897 were put under a system of administration similar to that now provided for the parks. The forests remained in the Interior Department until 1905, when their administration was transferred bodily to the Department of Agriculture, in order to secure complete freedom from political appointments, consistent technical and scientific management, and the attainment of the purposes required by law, the protection of the streams, and the renewal of the forests by use.

Following this transfer the National Forest Service was rapidly established. Its nucleus and inspiration was the body of young, enthusiastic men with high ideals, trained to the work in the best schools the nation afforded, and entering this service as a career worthy of a life work. Upon the character of the service thus secured for the public, has rested the success of the National Forest Administration, which has carried the work on, overcoming enormous obstacles, and has solved tremendous problems. For the National Forester had to build up from the ground, the great fabric of a business organization which is charged with using wisely the resources of over 160,000,000 acres of land, for the best interests of all the public. Timber must be sold under a policy which will protect watersheds,

preserve portions of the forest for scenery, secure reproduction of young trees, prevent fires from the slash, permit the logger a living profit, prevent monopoly of stumpage, and not work an injury by underselling private stumpage. Grazing privileges must be assigned, and fees collected by a system which will protect the small farmer, prevent waste of forage, secure the proper revenue, prevent damage to watersheds and young trees, settle feuds between sheep and cattle men and utilize the resources to the maximum capacity. Water-powers must be leased under terms which will permit development and secure proper rentals, while protecting the public from the evils of monopolistic private ownership. Tourists must be cared for, camp sites, lake shores and streams protected, trails and roads built, fires fought and a thorough system of fire protection inaugurated. Tree diseases and insects must be combated scientifically and efficiently. The public must be dealt with, not merely from the standpoint of summer visitors (of whom increasing numbers make use of the National Forests each year) but, at the same time, from the standpoint of the user of wood, of grazing, the prospector for minerals, the trapper, the small farmer and the representative of big business. There is hardly a form of commercial activity nor aspect of human affairs that the foresters of the National Forest Service have not encountered, and successfully handled in the 12 years since the Forest Service was established. In the year 1916, an income of over \$2,800,000 was secured, half of which was from timber, while grazing produced \$1,200,000 and water-power rental yielded \$100,000.

With this enormous and well-trained body of public officials, and a policy consistent, elastic and successful the question will be asked—why not transfer to the Forest Service the management of the National Parks? Di-

rector Mather voices the needs of the new department in the words, "We must develop a fine body of trained and public-spirited young men to carry on the park work to its great destiny."

The Park Service needs, and must get, men of the same general character, single-minded devotion to public work, and high efficiency as has always characterized the Forest Service. *But the Park Service and the Forest Service should remain separate just as the National Parks must always remain distinct from the National Forests.*

National Parks are created for one definite purpose, to preserve untouched the beauties of natural scenery, with its forests, waterfalls, and wild life. In National Forests the same care is shown to protect small areas whose value for scenic purposes outweighs that of the lumber that may be cut from the trees. But on the 160,000,000 acres of National Forests, the immense timber, grazing and power resources are not to be locked up to serve the single purpose of scenery. A proper balance of uses for the best good of all is attained.

On the parks this policy cannot and should not be adopted. Parks are areas of such transcendent interest, such striking beauty, that the desecrating touch of commercialism must not be permitted to defile by unsightly logging, by sheep or cattle grazing, or by power houses and transmission lines the picture of the primitive wilderness. *Let the American public beware of insidious attempts to undermine this policy,* and by introducing grazing, logging and power development, to so cheapen and destroy the unique character of our parks that they will no longer differ from National Forests, and the necessity for distinctive management will disappear altogether.

There is real danger of this degradation of the park standard. Most unfortunately, the new park law al-

ready sanctions commercial grazing in the parks, and permits of timber cutting under the guise of protection from insect ravages. If the public desires to protect the National Parks and preserve them as nature planned them, two things must be demanded—the absolute prohibition of all commercial uses, and the establishment of a non-political and efficient park management equal to that of the Forest Service and as free from pressure on the part of place hunters and politicians.

The specific danger to the whole movement lies in the temptation to create large numbers of new parks, which have but little of distinctive merit to justify the sacrifice of the commercial resources which lie within them—and then, in order to satisfy the local public to permit these resources to be used on a system practically identical with and duplicating that already established by the Forest Service. Let us hold our ideals so clearly that we shall compel their adoption. *National Parks shall not be commercialized.* If scenic features are not sufficiently valuable to the local public to justify the sacrifice of timber grass and waterpower development, they shall remain as National Forests. If the sacrifice is offset by the greater value of the public good, then let the park be declared.

Practically every acre of land suitable for new National Parks is already included in some National Forest. New parks do not mean new areas reserved, but merely a new jurisdiction and policy to supplant an already established management.

Let us not mix commercial developments with park uses. In this way only can we preserve our National Parks, and maintain the present natural distinction between both policy and administration of National Parks and National Forests.

FORESTRY IN VERMONT

BY RODERIC M. OLZENDAM, SECRETARY OF THE FORESTRY ASSOCIATION OF VERMONT

VERMONT, like so many of her sister states, has suffered in the past and will suffer severely in the future because she has allowed the heavily timbered slopes of her mountains to be stripped and slaughtered, burned and slashed, while the people sat complacently by, never giving even so much as a passing thought to the needs of the generations of Vermonters yet unborn. The extreme seriousness of this situation becomes readily apparent when one considers fully the fact that the total area of forest and waste land in the State of Vermont is 3,719,000 acres, or 64% of the total area of the commonwealth.

Realizing that some active aggressive and powerful force must be brought to bear in interesting the people of Vermont in forest conservation, a small group of influential men organized the Forestry Association of Vermont in 1904, having as its object the preservation and proper handling of this large forest area for the benefit of all the people of the State and their descendants. Filled with a sincere and genuinely unselfish desire to promote the welfare of their commonwealth, these men met frequently and gave unsparingly of their valuable time and ability to the cause of

conservation. It is to these men that the State looks with thankfulness and pride for the progress of forestry in Vermont. The results which have followed their singular forethought are gratifying.

For four years prior to 1908 there had been a Forest Commissioner, not a technically trained man, but in 1908 by act of the legislature the State Forestry Department was established. There were several reasons which convinced the legislature that this action was necessary. One of the foremost reasons was the serious forest-fire situation in 1908 when a great many fires seared and blackened the mountain sides of Vermont and other States. That the action was justifiable from the standpoint of the forest-fire problem alone is evident when one considers that the expense to the State for fighting fires in the seven years 1909-1916, inclusive, has been less than for the one year 1908, even though there have been several seasons just as dry and just as dangerous. This result is attributable to the facts that the Forestry Department has become thoroughly organized under a technically trained State Forester and his assistants, one of whom is the State Fire

Warden; that there are intelligent forest-fire wardens in every town guarding the interests of the forest; that look-out stations have been built on a number of our high mountains where look-out men and patrolmen are maintained, always alert and watching for the faintest sign of a fire; and, lastly, that the people of Vermont in general have been educated regarding the damage which follows in the wake of a forest fire. Thus, the ownership of forest property has been made safer than ever before and the damage done by fires in Vermont is less than in any other New England State. At a meeting of the Society for the Protection of New Hampshire Forests held the past summer, one New Hampshire lumberman made the significant statement that the State Forester of that State had earned a salary of \$100,000 a year in lessening the damage by fire. It is quite unnecessary to say that the said State Forester did not receive what he earned.

Up to 1912 there was no remedial legislation pertaining to forest taxation in Vermont. Land owners throughout the State were compelled to cut off their timber because of excessive taxes. The State Forester succeeded in having Acts No. 40 and 41 passed by the legislature. These acts make it possible for the man who desires to raise timber to do so and to figure in advance just what his taxes will be up to 1950. Vermont, Massachusetts and Connecticut are the three leading States in the matter of forest taxation.

The State Nursery for forest seedlings was established by the legislature previous to the beginning of the Forestry Department. Since the Department was organized the Nursery has been strengthened and enlarged and a very considerable amount of planting has been done throughout Vermont on private and public lands. During 1909-1910, 572,000 trees were planted. During the six years since the establishment of the department over 5,000,000 trees have been taken from the State Nursery and planted from one end of the State to the other. It is quite safe to say that these trees, if properly protected, will be worth in fifty years between one and two million dollars. These plantations will have a stimulative effect upon the wood-using industries which will be highly advantageous and they will serve as demonstration areas to interest other land owners in reforestation.

The policy of State Forests has become solidly entrenched in Vermont because the people believe in State ownership of large forest areas in the main range of the Green Mountains. The State now owns 14,000 acres of forest land in twelve different localities comprising some of the most beautiful scenery in Vermont. The largest tract is on Mt. Mansfield, the highest mountain in the State, and in Smuggler's Notch, one of the most beautiful spots in Eastern America. This tract consists of 5000 acres, the second largest State forest in New England.

Another tract of 3500 acres is situated on Camel's Hump, Vermont's most picturesque mountain. These two areas are of sufficient size to prove an increasingly good investment for the State commercially and scenically. The people are coming to realize that the State forests are their forests, that they may wander through them at will enjoying their many matchless attractions. More lands will be purchased as soon as the right kind of opportunities present themselves. All these forests are accessible and are really and in fact a part of the life of the people.

The campaign of education carried on by the Department and the Forestry Association through numerous lectures, field meetings, excursions and through the press has stimulated a keen and healthy interest in the forest and its problems. It is safe to say that the people of no other State are more interested in their forests than are the people of Vermont.

In coöperation with the State University investigative work has been carried on and several bulletins published giving valuable information, not only to Vermonters, but to all the people of the country who are interested in the questions of forest conservation. Vermont, like the other Eastern States, has become infected with the white pine blister disease. The Department of Forestry has carefully inspected all plantations and has the situation thoroughly in hand. Municipal forests have been made possible by act of the legislature and several cities now have their forests. As soon as the people become familiar with this policy many town forests will undoubtedly result. The Department marks trees for cutting on private lands and has just issued a bulletin on the marketing of private woodlands which should prove a help to private land owners.

Thus, briefly, it may be seen that forestry in Vermont has made rapid strides forward since the establishment of the State department composed of men who are technically trained foresters. Unfortunately, however, politics has been permitted to play too large a part in this progress. Forestry in Vermont has advanced in spite of political interferences. Free from politics one hesitates to say what might have been accomplished. Thirty States have Forestry Departments. In those States where the State Forester is appointed by the Governor or some other political officer, politics has interfered to such an extent that dissatisfaction and inefficiency are widespread, the law disregarded and trouble rampant. The preservation of the forests which we now have, the reforestation of the waste places, the education of the people to the vital need of care and forethought in dealing with the forests—these matters, in a State like Vermont, demand that the persons in charge shall be men technically trained, unhampered by politics and free to work unreservedly and fearlessly for the best interests of the State.

THE work of classifying and opening to homestead entry such lands in the National Forests as are chiefly valuable for agriculture is progressing rapidly. Already over seventy million acres have been covered by field examinations and the final reports acted upon.

INVESTIGATIONS by the Forest Products Laboratory, at Madison, Wisconsin, have resulted in the use of spent tanbark in the manufacture of asphalt shingles to the extent of 160 tons per week. The value of the bark has been thereby increased from 60 cents to \$2.50 per ton.

HOW OUR MEMBERS LIKE THE MAGAZINE

"I appreciate your efforts . . . and congratulate you on the improved condition of the magazine—AMERICAN FORESTRY. I am interested in its success, and have felt that the lumbermen generally, as they become better acquainted with the paper, will appreciate the efforts which you have made to place before the reading public the proper view of conservation and development of our timber resources."

MAJOR E. G. GRIGGS,
*St. Paul and Tacoma Lumber Company,
Tacoma, Washington.*

"I enjoy Dr. Allen's articles (Bird Department) very much and thoroughly approve of the department, as bird life is inextricably involved in the maintenance of our forests."

MAUNSELL S. CROSBY,
Rhinebeck, New York.

"I wish we could place the AMERICAN FORESTRY magazine in every home in the United States. It is a gem, and will inform the people, if we can get it into their hands."

T. P. LUKENS,
*343 Waverly Drive,
Pasadena, California.*

"The magazine now is certainly very interesting both to Forest Service men as well as to the general public, and I hope the circulation will increase in leaps and bounds in the future."

E. C. ERICKSON,
Portland, Oregon.

"The last number of the magazine is better than ever, and that is saying 'a whole lot.'"

DR. W. R. FISHER,
Swiftwater, Pennsylvania.

"The AMERICAN FORESTRY MAGAZINE has come, and it is a beauty and a joy,—thoroughly appreciated."

JOHN L. ROBINSON,
Swansboro, North Carolina.

"Hearty congratulations on the handsome appearance of AMERICAN FORESTRY for November."

ELBERT F. BALDWIN,
*Editor, The Outlook,
New York City.*

"Allow me to express the pleasure I receive from the freshness of your magazine, AMERICAN FORESTRY. The students enjoy reading it very much."

PROFESSOR JOSEPH BAILIE,
*University of Nanking,
Nanking, China.*

"The magazine is a mine of valuable information pertaining to the subjects taken up, and the illustrations are simply beautiful, and engrossing to study. I would not go on without my AMERICAN FORESTRY MAGAZINE."

MRS. D. WILLARD,
Riverside, California.

"The two issues of AMERICAN FORESTRY that I have received so far have been read from cover to cover. The magazine is instructive and inspiring. I am very much interested in the work of the American Forestry Association and will do anything I can to further it. It should have the hearty support of every patriotic American, since the work is intimately bound up with the welfare of this nation."

I. J. SCHULTE,
*Chief Accountant, Associated Advertising Clubs of the World,
Indianapolis, Indiana.*

"AMERICAN FORESTRY is a splendid magazine, full of information and inspiration."

THEODORE WIRTH,
*Board of Park Commissioners,
Minneapolis, Minnesota.*

"You have made a great magazine of AMERICAN FORESTRY,—it's of good meat from cover to cover."

CHARLES A. SCOTT,
*State Forester,
Manhattan, Kansas.*

"I take great pleasure in testifying to the very great excellence of the publication which has increased in interest with each year of its production."

DR. ELDRIDGE F. CUTLER,
Boston, Massachusetts.

"The magazine is very interesting and my neighbors are all much pleased in reading it."

A. R. BALDWIN,
Cacadero, California.

"I find AMERICAN FORESTRY vastly improved as a magazine and also as a medium for successful forestry propaganda. The magazine itself is the best evidence that you are endeavoring to give us all the best there is in forestry matters and also working hard for forestry extension. I hope you prosper."

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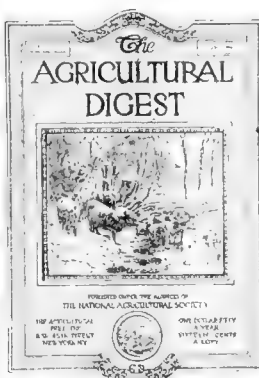
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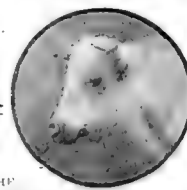
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CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY,
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FOREST ENGINEERS

During the last week in November a deputation composed of representatives of the Canadian Forestry Association, the Canadian Society of Forest Engineers, the Bankers' Association, the Canadian Lumberman's Association, the Insurance Underwriter's Association, the Woodworker's Union, the Carpenter's Union, the Mining Industry, the Railroads, the Fire Protective Association and the Settlers in Northern Ontario, waited on the Hon. Mr. Ferguson, Minister of Lands, Forests and Mines of Ontario and asked him to reorganize and make effective the Forest Fire Protection Department. After the various speakers had finished the Minister stated that he had carefully considered the matter, had consulted with other Provinces, and had decided to reorganize the service and to make it into a separate department under Mr. E. J. Zavitz, Provincial Forester. He promised that he would introduce legislation requiring all settlers to have permits from the fire rangers before burning their clearings, and that he would make all appointments to this service on the basis of merit only and not for political considerations. This will be a long step forward for Ontario and the Minister is to be heartily congratulated on it. This deputation is the culmination of several years' work on the part of the Canadian Forestry Association.

Mr. E. J. Zavitz, who will take charge of this important work, is a technically trained man, one of the first professional foresters in Canada, a member of the Canadian Society of Forest Engineers, the Society of American Foresters and the American Forestry Association. A man of the highest integrity, public spirited and thoroughly capable. He has had charge for many years of the Ontario Government forest tree nurseries and the reforestation work among the farmers and on drifting sands and recently has been Provincial Forester. Under him this fire protection work should attain a high standard and now that his Department will be free from the patronage evil we feel sure he will make a splendid record and wish him all success in his work.

At the meeting of the Technical Section of the Canadian Pulp and Paper Association one of the papers was on the relation of forestry to the pulp and paper industry and there was a very interesting discussion following it. This industry is realizing more and more its absolute dependence on the forests and this means better cutting methods and eventually planting on a large scale.

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FOR many years we in America have spent much time bemoaning the disappearance of our feathered game. But the fact that we have little game to shoot and little to eat is due solely to our own lack of initiative. We *should* have an abundance of game in the fields and on the market. We may obtain such an abundance by creating a supply equal to the demand. This can be done by increasing nature's output through game farming. And moreover, the demand may be much greater than at present, and still be easily met.

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To anyone who has a small amount of land, game farming will prove profitable. The demand for eggs and for breeding stock is much greater than the supply, and will be for years to come. Pheasant eggs sell today at from \$20 to \$25 a hundred. Live birds bring from \$5 to \$7 a pair.

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But this subject is too big to be properly treated in this space. If you are interested in it, either as a prospective breeder, as a sportsman, or simply because you believe in the movement as constructive and progressive, write for the book, "Game Farming for Profit and Pleasure," which will be sent to you without cost. It tells of the subject in a most interesting and informative manner. It is well worth reading. Fill out the coupon below and a copy will be mailed you at once.

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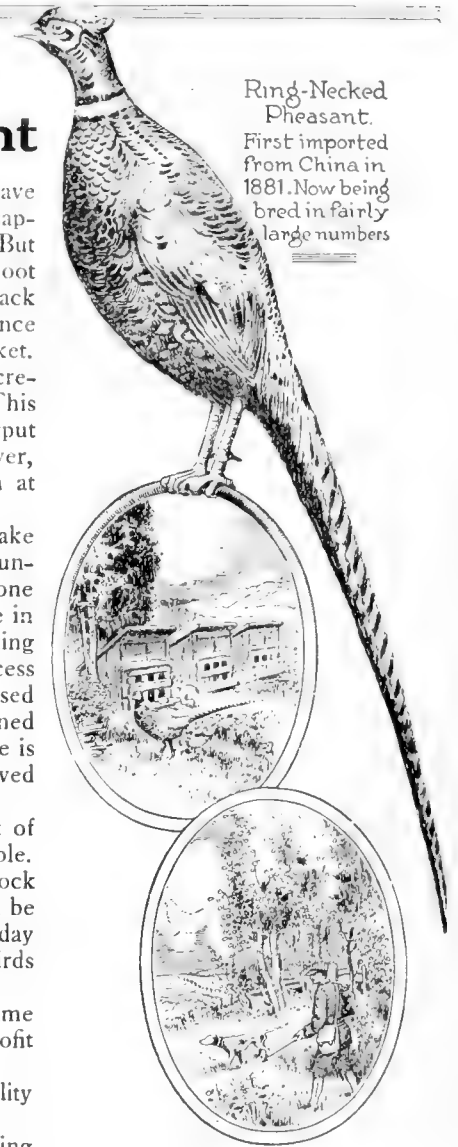


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Honorable H. C. Brewster, the newly elected Premier of British Columbia, has come out flat-footed for civil service principles and the merit system and deserves the highest praise and the congratulations of all good citizens, on his stand. In replying to a letter from the Forestry Association asking him to apply civil service principles to the Forestry Branch, he says, "I note also your intimation that efficient service could be secured best by the entire elimination of the patronage system from the Forest Service. It will be the intention of the new Government to abolish the evils of the patronage system, wherever these have been in evidence, and the Forestry Service will, in no sense, be an exception to this rule."

The membership of the Canadian Forestry Association has increased by 750 new members since last January and its influence and record of accomplishment are constantly growing. The Secretary, Mr. Robson Black, has done most excellent work and his fall lecture tour has been most successful. He is now sending a French-speaking lecturer through the eastern townships of Quebec and he expects to hold a local meeting of the Forestry Association at Sherbrooke.

The appearance of the white pine blister rust in Canada is causing much anxiety and the Forestry Association will urge Dominion action to check it. It is reported that the splendid pine forest planted some forty years ago by the monks at Oka has become infected.

Every year as soon as the snow comes it is the custom and the law that the roads must be marked by trees or poles to show where the road is. The snow becomes so deep and it is so difficult to find the track after a heavy snow or at night that were it not for these guide posts the horses would get off the roads and might not be able to get back. Then too, the roads are all single track and it is necessary to mark the turnouts so that teams coming from opposite directions may arrange where to pass. It has always been customary to use small spruce and balsam trees for this purpose but it is such a wanton waste that a movement is on foot to compel the use of alder, birch and poplar and such species as are of practically no value.

Mr. Piché, Chief Forester of Quebec, has made some very interesting studies during the past summer on cut-over lands of the River Ouelle Pulp and Paper Company, and has laid out some experiments in cutting to be undertaken by them next year. This coming summer he will make some studies on the cut-over lands of the Laurentide Company, Limited, to determine the probable future cut possible.

The Dominion Government Forest Branch have inserted a clause in their cutting contracts requiring the piling and burning of brush, and the Department of Indian Affairs

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has done the same thing but it is said will make some concession in the way of stumpage reduction to help cover the extra cost.

The Honorable Thomas Dufferin Pattullo has been chosen as Minister of Lands in the new administration formed by the Honorable H. C. Brewster. Mr. Pattullo represents the District of Prince Rupert in the provincial legislature, a section of the country containing considerable forest resources.

The appointment is announced of Messrs. F. A. Sabbaton, Laurentide Company, Ltd., representing the paper industry; Mr. Thorn, Riordon Paper Company, Ltd., the sulphite pulp industry; Mr. Hellin, of the Wayagamac Pulp and Paper Company, Ltd., the sulphate and soda pulp industry; and Mr. G. F. Duncan, the Provincial Paper Company, Ltd., the high grade paper industry, as an advisory committee to co-operate with the Forest Products Laboratories.

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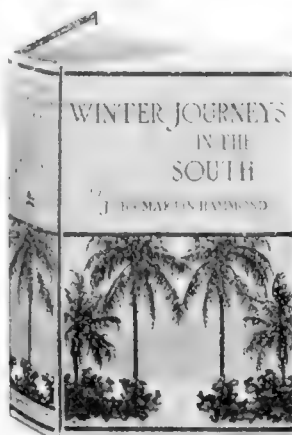
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Empire State Forest Products Association Meets at Syracuse, New York

Various angles of the forest policy of New York State were discussed thoroughly at the 11th Annual Convention of the Empire State Forest Products Association held at Syracuse, New York, recently. After a short address of welcome by Mayor Walter R. Stone and an address by George N. Ostrander of Glens Falls, New York, President of the Association, Honorable Virgil K. Kellogg of Watertown, New York, reported for the legislative committee. A report from the Forestry Committee by Professor Nelson C. Brown followed this and after other routine business Mr. Henry H. Tryon of the State College of Forestry at Syracuse, New York, read a paper on "Insurance on Standing Timber." The morning session ended with a discussion on "The Present Results of Coöperation between Private Woodland Owners and the State for More Efficient Protection of the Forests Against Fire." This was led by F. A. Gaylord, Chief Forester of Nehasane Park, New York, and William A. Howard, Assistant Superintendent of Forests. The afternoon was given over to papers on "Public Policy in Relation to Management of Forest Lands in the State of New York," by Conservation Commissioner George D. Pratt and "Hardwood Logging in the Adirondack Forests," by Professor A. B. Recknagel of the State College of Agriculture at Ithaca, New York. Following these there was a discussion on "The Relation of Hardwood to Softwood Logging in the Adirondack Forests" led by Ferris J. Meigs, President of Santa Clara Lumber Company and W. C. Hull, Vice-president Oval Wood Dish Company. At the evening banquet addresses were given by Hon. Francis M. Hugo, Secretary of State; Hon. Thaddeus C. Sweet, Speaker of the New York State Assembly; Hon. John M. Clancy, President of the Syracuse Chamber of Commerce and Frank N. Moore, of Watertown, New York.

An automobile trip was arranged for the members of the Association and the new State College of Forestry building was inspected throughout. The College of Forestry also maintained a small exhibit throughout the Convention at the Onondaga hotel.

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Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

He walked with Kings

He could not know, standing there in his bare feet and his rough clothes, with his little schooling, that kings would do him honor when he died, and that all men who read would mourn a friend.

He could not dream that one day his work would stand in Chinese, in Russian, in many languages he could not read—and from humble doorman to proudest emperor, all would be gladened at his coming.

He could not know that through it all he would remain as simple as democratic, as he was that day as a boy on the Mississippi

MARK TWAIN

He made us laugh, so that we had not time to see that his style was sublime, that he was biblical in simplicity, that he was to America another Lincoln in spirit.

To us, to everyone in the United States, he was just Mark Twain—well-beloved, one of ourselves, one to laugh with, one to go to for cheer, one to go to for sane, pointed views. Now he is gone, the trenchant pen is still. But his joyous spirit is still with us. Mark Twain's smile will live forever. His laughter is eternal.

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hard work—disaster—good humor—and final, shining, astounding success.

He fought with poverty, he fought with disaster, he lost those dearest to him. But he won.

Because he was of high and brave intellect, because he had humor as deep and as true as the human heart, and because he had struggled with life, he was a great man. So his works are great.

As Children We Loved Him

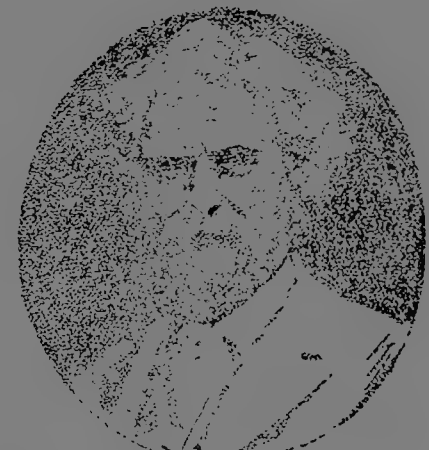
They say that children know the inwardness of things. A child knows the heart of a man. We as children instinctively knew Mark Twain was so much greater, so much truer than anybody else that there was no one to compare him with.

Now grown up, we know the reason why. He had the heart of a child. He had the style of a master, he had a character of rare beauty.

Frontispiece of
"The Boy's Life of
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by A. B. Paine

The Great American

He was American. He had the idealism of America—the humor, the kindness, the reaching toward a bigger thing, the simplicity. In his work we find all things, from the ridiculous in "Huckleberry Finn" to the sublime of "Joan of Arc"—the most spiritual book that was ever written in the English language, of serene and lovely beauty as lofty as Joan herself. A man who could write two such books as "Huckleberry Finn" and "Joan of Arc" was sublime in power. His youth and his laughter are eternal; his genius will never die.



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VOL. XXIII

FEBRUARY 1917

NO. 278

THE WHITE PINE BLISTER DISEASE

Congress asked to make an appropriation of \$300,000 to provide for its eradication or control—Experts present facts regarding the disease at the International Forestry Conference of the American Forestry Association—The resolutions adopted.

While the International Forestry Conference called by the American Forestry Association discussed ways and means of fighting the pine blister disease which threatens the five-leaved pines of the United States and Canada, in session, at Washington, D. C., January 18 and 19, 1917, Vice-President Marshall laid before the Senate an official communication asking for a supplemental appropriation of \$300,000 to eradicate or control the disease. This communication was from Secretary of the Treasury McAdoo and transmitted a letter from Secretary of Agriculture Houston asking for the appropriation. It was submitted to the Senate with the signature and approval of President Wilson, was referred to the Committee on Agriculture and Forestry and on February 3 the Senate adopted an amendment incorporating it in the Agriculture Appropriation Bill.

The series of articles which follow are from addresses delivered at the Forestry Conference.

WHAT THE WHITE PINE BLISTER DISEASE IS

BY PERLEY SPAULDING, U. S. FOREST PATHOLOGIST

IF Luther Burbank, the well-known breeder and introducer of new plants, were to announce that he had for sale a perennial plant that in the spring produced seeds of rye, in the early summer seeds of wheat, and in midsummer seeds of barley, a sensation would be produced, which, if his announcement proved true, would surpass any yet known to American agriculture. The white pine blister rust parasite is exactly comparable to such a plant as this, however. Nor is it alone in this power to produce seeds of three distinct kinds. There are

thousands of lowly organized plants closely related to the white pine blister rust parasite which regularly produce three or more forms of seeds, or spores. The life histories of some of these chameleon-like plant parasites are most fascinating subjects for the amateur scientist could they but be presented by an Ernest Thompson Seton or a John Muir.

The white pine blister is a destructive, foreign parasitic disease of the white pines (pines with their needles in bundles of five each). It came to us from Europe in

RESOLUTION

Passed at the International Forestry Conference of the American Forestry Association
January 18-19, 1917

Whereas

The Pine Blister Disease threatens to greatly injure the white pine forests of Eastern North America, and is a growing danger to the white pine timber of the West, and its origin, propagation and transmission being now generally understood.

Resolved

That it is the sense of this Conference that active measures should be taken by the duly constituted authorities and by all good citizens along the lines advocated by the officials competent to recommend practical measures for preventing the further dissemination and, as far as possible, for the elimination of the disease.

Resolved

That immediate action should be taken by the Federal governments of the United States and Canada for adequate quarantine measures to prevent the spread of the disease to sections of the Continent not now known to be infected.

Resolved

That co-operation by the Federal governments with States and Provinces to eradicate or control the disease in sections now infected should be continued and extended by liberal appropriations.

Resolved

That the States and Provinces, both independently and by interstate, National and international co-operation, are urged to conduct complete investigations, provide proper quarantines and take all necessary measures, in keeping with the seriousness of the situation, to eradicate or control the pine blister disease.

Resolved

That a copy of this resolution be transmitted to the Secretary of Agriculture, to the chairmen and members of the United States House and Senate Committees on Agriculture and Forestry, to all members of the United States Senate and to the Governments of the Dominion of Canada and of the Canadian provinces.

FEB 28 1917

diseased nursery stock of white pines **and in no other way.** The parasite is a low form of plant similar to, and closely related to, the wheat rust and cedar apple rust parasites. The former has two phases of development; one upon leaves of the barberry and the other upon the wheat plant. The latter also has two phases of growth; one upon the leaves of cedar and the other upon the leaves

berries. The parasite lives in the bark of an infected pine and after it once appears, produces a crop of spores each spring as long as that pine lives. If there are no currants or gooseberries near enough to the diseased pine for the spores to be blown from the pine to the currants and gooseberries the disease cannot spread any farther, because the "pine" spores cannot attack pines.



Photograph by J. Franklin Collins.

THESE TREES ARE INFECTED

Practically all these pines on Gerrish's Island on an arm of Portsmouth Harbor, Maine, are generally infected with the pine blister disease.



Photograph by J. Franklin Collins.

AN INFECTED PLOT OF PINES

Eighty per cent of the native white pine on this random quarter-acre plot near Kittery Point, Maine, were, in November, 1916, infected by the pine blister disease.

and fruit of the apple tree. In the same way the white pine blister rust has two phases of growth on two distinct hosts; one phase on the young bark of white pines, and the other phase on leaves of wild and cultivated currants and gooseberries. Three distinct kinds of spores are produced in a season.

In the spring spores are formed on the diseased white pine bark; they are blown about by the wind and infect the leaves of neighboring currants or gooseberries, but they cannot attack pines. They are rather short lived.

In early summer the second spore form ripens on the lower surface of infected currant or gooseberry leaves. These can attack currant or gooseberry leaves but cannot attack pines. The third spore form ripens also on the lower surface of the currant and gooseberry leaves. These spores are able to attack pines but not currants or goose-

FEDERAL ACTION REQUIRED IN FIGHTING THE PINE BLISTER DISEASE

1. A federal quarantine prohibiting shipment of all five-leaved pines and all currant and gooseberry bushes beyond the western boundaries of Minnesota, Iowa, Missouri, Arkansas, and Louisiana, to prevent the introduction of the pine blister disease from the eastern white-pine area into the western white-pine forests of the Rocky Mountain and Pacific Coast States.

2. A federal quarantine regulation prohibiting the shipment of all five-leaved pines and all currants and gooseberry bushes from infected areas into regions where the disease has not yet been found. This action could be taken at once and would save the public great prospective loss. At the present time, all pine, currant and gooseberry planting stock, from nurseries or the native woods, must be suspected of being infected. The direct loss through death of diseased pine stock, though considerable, is insignificant when compared to the cost of controlling the disease, or, if not controlled, the early loss of native and planted pines which might otherwise thrive for years.

3. Scouting should be continued on an extensive scale, to determine definitely the boundaries of infected areas, and to locate possible infections in new territory.

4. Large-scale experiments should be undertaken to determine the feasibility of controlling the pine blister disease, and the least expensive means of accomplishing this result most effectively.

The distance that the "pine" spores may be blown is unknown. The greatest distance definitely known is about 400 feet. The spores produced on currants or gooseberries are known to blow one-half mile or over and infect other currants. How much farther they may go no one knows. From currants infection has been traced to pines by McCubbin, of Canada, up to an extreme distance of 100 yards.

This gives us an immense advantage when we attempt to eradicate it from a given locality, the mere separation of the two hosts being sufficient to stop further spread of the disease. But this involves the sacrifice of one host in any given locality. In some places the removal of all white pines involves less loss than does the removal of all currants and gooseberries; while in other places the reverse is true. In either procedure a few hoggish people

are encountered who, rather than sacrifice a few dollars, or in some cases less than a dollar, will object to removal of their bush or tree and thus endanger hundreds and even thousands of dollars' worth of trees or bushes in their locality, besides giving the disease a chance to become so

to the white man, relatively mild disease. In the same way the smallpox destroyed entire tribes.

The same thing that happened to the Indians from newly introduced diseases is already happening to one of our broad-leaved trees. The American chestnut, lacking



Photograph by J. Franklin Collins.

TWO MORE VICTIMS

Both these native white pines in Maine have been killed by the pine blister disease and all the trees in the background are infected.

well established that it never can be eradicated. The Federal Government has put a stop to our receiving any more young diseased white pines from abroad. It remains for us to get rid of what we have. Either the white pines or the currants and gooseberries must go in many localities if this disease is to be stopped in its spread.

It is a well proven fact, known to all students of parasitic diseases, either of plants or animals, that constant association for many centuries with a parasitic disease develops some degree of resistance in the host plant or animal. This results from the total destruction of those individuals which fail to develop resistance, thus leaving a residue of partially resistant ones. In the early days of exploration of North America the measles was introduced among the North American Indians from the Old World. The Indians, who had not the slightest degree of resistance to the new disease, were destroyed in thousands, by this,



Photograph by S. B. Detwiler.

175 INFECTIONS ON THIS PINE

This tree at Ipswich, Massachusetts, was imported from France in 1902. It was removed from the plantation in 1916 at which time there were 175 pine blister disease infections on it. Some of them are shown, being marked by white tags.

the ability to resist a new chestnut parasite imported from China, is now well on the road to extermination.

In those places (in this country) where this European pine rust has worked longest undisturbed, it is doing with our non-resistant white pine just what the paleface disease did to the Indians and the foreign chestnut disease is now doing to our chestnuts. It has shown itself positively capable of destroying our white pine. The eastern white pine is not the only American white pine that is threatened by this insidious danger. There are seven other pines of the Rocky Mountain and Pacific Coast regions that will surely be attacked if this disease is not fought to a standstill where it now is. All of these are new to the disease and are likely to go the way of the Indian with the smallpox and the chestnut with the bark disease, if the white pine blister disease once reaches them.

WHAT SHALL WE DO ABOUT THE PINE BLISTER DISEASE?

By S. B. DETWILER, U. S. FOREST INSPECTOR

DEVELOPMENTS in the pine blister disease situation during the past year have crystallized sentiment among those interested in forestry and familiar with the facts into desire for immediate and concerted action. A few conservatives have taken the attitude that it is useless to attempt the control of any forest tree disease in this country because it has never been done. The general opinion among foresters and plant pathologists is that the white pine is too valuable to lose and that vigorous efforts should be made to fight the

pine blister, since there is no longer room to doubt the ability of this disease to completely kill all white pines growing in proximity to currant and gooseberry bushes. Although it is not proved by practical experience on a large scale that the disease can be completely controlled by the destruction of diseased pines and the elimination of all currant and gooseberry plants within areas of general disease, this plan has proved to be effective in checking the spread of the fungus from infected plantations.



TREE AT SWANSEA, MASSACHUSETTS

This white pine tree in native growth is about 30 feet high and shows the main stem girdled near the top. S. B. Detwiler, U. S. Forest Inspector, is making the examination.



THIS WAS DESTROYED

A fine white pine of native growth near Ipswich, Massachusetts, which showed so many pine blister cankers on the branches that it was marked for destruction before the spores which would have developed this year and spread the disease appeared.

It is certain that the blister disease cannot pass from pine to pine without passing through the intermediate stage on currant or gooseberry leaves. Therefore, the only question that can arise concerning the effectiveness of the proposed method of controlling the disease is whether it is possible to destroy all the currants and gooseberries on a given area and thereafter keep it free, and whether the value of the pine will justify the cost of the work. Further experience in eradicating currant and gooseberry bushes on a large scale will undoubtedly develop cheaper and more effective methods, as for instance, killing strongly-rooted bushes or mats of skunk currants by means of chemicals sprayed on the leaves. The destruction of the diseased pines is an additional

COÖPERATION BY CITIZENS REQUIRED IN FIGHTING THE PINE BLISTER DISEASE

Federal and State action, to be successful, requires the active coöperation of individual citizens in the following particulars:

1. When the disease is found on pines, currants or gooseberries, the State officials in charge of control work should be notified, and the diseased plants destroyed promptly, according to the recommendations of the authorities.
2. Where State authorities deem it necessary to destroy all currant and gooseberry bushes, or take other drastic action to control the disease, individuals should give all possible aid and influence others to do so.
3. The general planting of five-leaved pines should not be encouraged. The growing of currant or gooseberry stock should not be favored in localities where they may endanger white pines. In the case of white pine planting stock, the nursery from which it is purchased should be required to give a written guarantee that the stock was grown from seed in their own nurseries, that no infections of the white-pine blister disease have ever been found in the nursery or within 500 yards, and that the trees have not stood near currant or gooseberry bushes.

precautionary measure that appears advisable in large control areas to prevent the disease being carried to currants and gooseberries beyond the borders of the area.

When small spots of infection exist beyond the region of generally scattered disease, it will usually be advisable to destroy both pine and currant hosts known or suspected as having been exposed to infection, and the greatest sanitary precautions taken, such as sterilizing the uniform of inspectors, and disinfecting the plants having fruiting bodies of the fungus before they are handled, during such time as the spores are visible.

At the present time, the legal and financial barriers standing in the way of controlling the disease appear even greater than the practical difficulties. It will con-

sume time to secure the required laws and appropriations, and meanwhile the disease will continue to advance rapidly into new territory. Time lost in efficiently applying control measures during the coming season will be dearly paid for if any future control is to be attempted.

It is plain that the greatest immediate need is widespread publication of the facts of the blister rust invasion, and rousing the general public to a realization of the dire results which this disease will cause if not controlled.

The blister canker fungus does not respect state or national boundary lines in its rapid spread. Effective control requires general action—state, interstate, national

and international. Nothing can be accomplished without adequate appropriations, and before the money can be wisely spent, most states need laws giving the authorities full power to apply the necessary steps in control. Publicity will secure the necessary power to act and act quickly; concerted action by state and national authorities is the only possible salvation for the pines. Nature has not intervened in checking the chestnut blight and other imported diseases, and it seems probable that we shall have to pay with the white pine, or a partial cash equivalent, for our open-door policy in importing plant pests.

SHALL WE PLANT WHITE PINE?

By C. R. PETTIS, SUPERINTENDENT STATE FORESTS, STATE OF NEW YORK

AS an economic necessity and in the application of true conservation and practical forestry, the wisdom of reforestation cannot be questioned. There are millions of acres of our soil whose productive use can best be and, to a large extent, can only be realized by using them to grow woodcrops. This vast territory stands to-day idle. To become productive, it must first be reforested. In order to derive the full measure of use a tree adapted to grow under the prevailing condition must be selected. White pine has no equal in meeting and measuring up to the specifications of a tree that can be most profitably employed in reforestation generally in the northeastern United States. We cannot make many mistakes when we use white pine as an agent for employing the resources of nature in obtaining the productive capacity of these non-agricultural lands.

In the market, white pine is in great demand and on account of its qualities has a wider range of uses than any other wood we can grow. It is our most commonly used tree. Go into nearly any line and study its great variety



BRANCHES AND TWIGS DISEASED

In this tree at Ipswich, Massachusetts, there is to be plainly seen a large amount of pine blister disease on the branches and twigs.

of uses. It measures up to our demands for a wood for general purposes.

White pine is to forestry in the northeastern states what wheat is to agriculture; what iron is to manufacturing or what coal is to transportation.

I have tried to state briefly why we must reforest and what an important factor white pine is in the future planting operations. We must have white pine for planting.

In answer to the question "shall we plant white pine?" I most emphatically say, yes. We must have white pine. We will obtain our chief future supply from plantations.

We to-day face a problem. We do not know all about the distribution of the blister disease, and as reforestation deals in future, we **should defer further white pine planting until we know where it is safe and sane to plant.** We must first make the unsafe places safe and expend every energy toward the control of this disease. We must plant but should defer it for a while.

We are gathered here to repent for haste. Our various forestry departments, associations, land owners and others about 1908 became enthusiastic about planting. The

necessary trees could not be obtained in this country at a reasonable price and, as a result, large quantities were imported and scattered in a thousand places. Unfor-



Photograph by S. B. Detwiler.

GIRDLED BY BLISTER DISEASE

A native white pine at Kittery Point, Maine, with the base and lower side branches girdled by the blister rust. The quarter-acre plot in which this tree stood showed 88 per cent of trees infected in November, 1916. Twenty-six per cent of the trees were dead.

unately, some of these trees were diseased and we now must decide what we are going to do about what President Pack so well calls "A Bandit from Abroad."

Let us take a lesson from some of these many unfortunate circumstances. Why not meet the situation frankly? We must stop the spread of this disease. It can only be accomplished through eradication and control measures. We cannot fairly ask the farmer to give up all his currants and gooseberries that the forester may utilize his soil for growing pine. We must both of us make sacrifices. In places, pines will have to be removed as part of the control plan. We cannot now say where the immune strips are to be placed. The extension of white pine planting, under present conditions, may further the spread of the disease as well as make the control measure more difficult. The problem is difficult enough as it to-day exists.

A few years more of idleness of these soils is nothing in comparison to the future safety of white pine. We have not gained but rather lost through past haste. Wait until we first fully know where "we are at."

A study to ascertain the extent of the disease, location of different kinds of soil, also distribution of pine, currants and gooseberries, will add so materially to our knowledge that future plans can then be formulated.

For the time being, we should expend our energies in field investigations, control work and education of the public.

The general progress of reforestation need not be seriously interfered with because we may direct our energies to planting lands not best adapted to white pine with suitable species.

THE PINE BLISTER DISEASE PROBLEM AS A WHOLE

DR. HAVEN METCALE, IN CHARGE OFFICE OF FOREST PATHOLOGY, U. S. DEPT. OF AGRICULTURE

THE white pine blister disease has invaded America and dug itself in. The earliest importation of white pine nursery stock that we have been able to trace

dates back only to 1899, but in this time the disease has become generally prevalent upon gooseberries and currants in New England, and at many points has established



Photograph by J. Franklin Collins.

IN A BADLY INFECTED AREA

This tree, photographed with a white cloth behind it to show the infection, had its main stem and many branches girdled by the pine blister disease. It is in a four-acre plot in Maine. In November, 1916, 87 per cent of the trees on the plot were infected and 16 per cent were dead.



Photograph by J. Franklin Collins.

WHERE SPORES WERE PRODUCED

Native white pine at Kittery Point, Maine, showing the main stem and many side branches infected. The rough bark on the main stem and at the bases of some side branches show that the disease has produced spores during the past season.

itself upon pine trees growing under as nearly normal conditions as can still be found in New England. West of the Hudson River the disease occurs at many points, but cannot be considered established, unless possibly in the Minnesota-Wisconsin area. West of the Mississippi River the disease is not known to occur, and it is wholly improbable that it can ever spread across the treeless plains to

the forests of western white pine and sugar pine by any natural means. It can, however, get there easily and quickly on diseased nursery stock and indeed may have gotten there already without our knowledge.

It is obvious that the control of this disease presents three very different problems:

(1) The problem for the western states, which is, so far as we know, entirely that of keeping out the disease. We must make sure that the disease does not already occur west of the Mississippi, and then make sure that by some means all movement into this area of nursery stock of five-needled pines, currants and gooseberries is stopped. Except in Oregon, Idaho and Montana, where local quarantines have been imposed, no effective restriction exists at the present time on the movement of five-leaved pines, currants and gooseberries from any eastern locality to any western point. It would obviously be foolish to spend much money in determining where this disease occurs, or in eradicating it where found, as long as nurseries are still free to distribute the disease as fast as it can be located.

(2) Between the Mississippi and the Hudson Rivers we have conditions similar to those obtaining in the coun-



Photograph by S. B. Detwiler.

CURRENT AND PINE

Here are seen infected flowering currant bushes in the corner of a yard at Kittery Point, Maine, with native white pine in the background and a large percentage of the pine already show the pine blister disease infection.

try at large seven years ago, that is, scattering infections of the disease, that can still be eradicated. In undertaking this problem we must profit by the experience of the past seven years. Up to this year the problem has nowhere been very vigorously attacked. State laws are mostly inadequate. In many states no eradication outside of a nursery is possible except with the consent of the

owner. In other states the state authorities have no power to destroy diseased currants and gooseberries, because the disease does not seriously damage these plants, and in few if any states is there authority for destroying healthy currants and gooseberries which are so located as to spread the disease. Nowhere has the Federal Government any power to destroy diseased plants of any kind. Up to a year ago there have been no specific appropriations for fighting this disease, and what has been done on this disease has been done as a side issue, and at the expense of other lines of work. If, then, the disease is to be eradicated over this wide central territory it will mean a sharp revision of law in most states, education of public sentiment to the point where the interests of one citizen cannot prevail against the interests of an entire community, or the interests of one community or one line of business prevail against the interests of an entire state. We must look forward to a long fight, for a disease with a long dormant period, and as strongly entrenched as this one, will not be overcome in three or four years. And finally, all action must be prompt. The time to combat any plant disease is while there is still but little of it.

STATE ACTION REQUIRED IN FIGHTING THE PINE BLISTER DISEASE

The various states in the white-pine belt should proceed against the disease, as follows:

1. Adequate laws should be enacted, giving authority to the proper state official to destroy all white pine, currant, and gooseberry plants infected with the disease or in danger of becoming infected. Because of the need for persons handling diseased plants to take the greatest precautionary measures to avoid distributing the spores of the disease from one place to another, eradication of the diseased plants should be done by men in state employ, specially trained and wearing a uniform that can be disinfected before approaching the vicinity of pines or areas of disease-free currants.

2. Each state should establish a quarantine preventing the introduction of any five-leaved pines, or any currant or gooseberry bushes from any area in which infection is known to exist, duplicating the action taken by the States of Wisconsin and Oregon.

3. Each State in which white pine is important as a native or planted tree should appropriate sufficient funds to enable the proper State official to conduct such operations as may be necessary for detailed scouting and the control of the disease when found.

4. Cultivated black currants should be declared a pest, and the bushes destroyed in all States where five-leaved pines grow, regardless of whether the disease has appeared in the locality. This action is advisable because the cultivated black currant is especially susceptible to infection, and the elimination of this plant would do much to prevent the rapid spread of the fungus.



Photograph by S. B. Detwiler.

FROM GARDEN TO WOODLAND

A garden of an estate at Ipswich, Massachusetts, in which infected currant bushes are growing. The white pine in the background were planted in 1903 and in the spring of 1916 all of them showed infection.

(3) East of the Hudson River the problem is much more serious, and here the disease is unlikely ever to be eradicated. Here the effect of the disease is essentially to make the pine tree a cultivated plant, dependent for its existence upon the destruction of currants and gooseberries. It will have to be determined for communities or for larger areas whether the people prefer to grow white pine trees or currant and gooseberry bushes, for the two are now incompatible. The probable solution of this problem is that certain areas will be found in New England where the currant and gooseberry can be eradicated and the white pine grown. And there will doubtless be other localities where the eradication of currants and gooseberries is commercially impracticable and where the growing of white pine will have to be given up.



Photograph by J. Franklin Collins.

DISEASE PLAINLY INDICATED

Eighty-one per cent of the trees surrounding this on a quarter-acre plot in Maine are infected with the pine blister disease and of these 12 per cent were dead in November, 1916.

The entire problem is, however, but one phase of a larger problem, which may be stated as follows: Does free trade in plant diseases and insect pests pay? Is it an economically sound national policy? Is the entire importing nursery business worth as much to the country as the damage which it causes? Let us not deceive ourselves. Not a single plant disease or insect pest that has once become established in this country has been eradicated or is ever likely to be. No matter how well controlled, it remains in every case a permanent tax against the economic resources of the nation. If we succeed in controlling the white pine blister rust we may be sure that other diseases and pests will be introduced, which will be just as serious, for we know definitely that the

undesirable plant immigrants are not all here yet. It is as important to safeguard the country against further invasions of this kind as to control this or any other disease or pest that has already been carelessly permitted to establish itself.

THE SITUATION TODAY

The United States Senate has added \$300,000 to the Agricultural Appropriation Bill for the eradication or control of the White Pine Blister Disease.

\$150,000 of this amount will not be available until states in the pine belt provide state appropriations—then it will be used in state coöperative work.

The United States Senate has also amended the Plant Quarantine Act to permit the Secretary of Agriculture to quarantine any State, Territory or District of the United States, or any section thereof, to prevent the spread of the disease.

Massachusetts asks a \$60,000 state appropriation to fight it.

New York requires \$30,000.

Minnesota desires \$25,000.

Maine asks for \$20,000.

New Hampshire asks for \$28,000.

Vermont wants \$2,000.

Connecticut requests \$15,000.

Rhode Island wishes \$5,000.

Wisconsin needs \$25,000.

Pennsylvania demands \$10,000.

Canada expects \$50,000.

LOSSES CAUSED BY IMPORTED TREE AND PLANT PESTS

BY C. L. MARLATT, CHAIRMAN, FEDERAL HORTICULTURAL BOARD

In view of the fact that fully fifty per cent of the tree and plant pests which in the past and at the present time are doing millions of dollars' damage every year to the agricultural and forest crops of the United States are imported, the American Forestry Association at its International Forestry Conference at Washington, D. C., January 18-19, 1917, heard addresses and discussions on the advisability of a national quarantine preventing the importation of tree and plant stock from other continents, unless such stock has the approval of the United States Department of Agriculture. The following is one of the addresses.—EDITOR.

THE virgin lands of the new world had originally an enormous advantage over the long-settled areas of the old world in their freedom from the host of plant enemies, insects and disease, which had developed through centuries of cultivation of special crops, and, if proper safeguards had been instituted, this advantage could have been largely preserved. Unfortunately, none of the countries of the new world, until very recently, took any precautions to prevent the introduction of these old-world plant enemies.

Confining our attention to the United States particularly, as a result of this neglect, probably more than

actively recently introduced pest, getting first foothold in Utah, from whence it has extended its devastations over much of the great alfalfa-producing areas of the adjoining states. Among the fruit insects are such well-known enemies as the codling moth, now entailing a cost for the treatment of trees and loss from injury to fruit taken together of approximately \$16,000,000 a year; and the San José scale, introduced with ornamental plants from North China, occasioning a loss in product and cost of treatment of at least \$10,000,000 a year. Among forestry insects are such notable enemies of forest trees as the larch sawfly, which threatens to complete the destruction



COTTON BOLL WEEVIL (*ANTHONOMUS GRANDIS*)

The cost to this country of the cotton boll weevil amounts to about twenty-five million dollars a year. It is gradually spreading throughout the cotton belt, and in 1916 reached northward to the South Carolina line. The picture, enlarged, shows an adult boll weevil.



BOLL WEEVIL LARVÆ

The manner in which the larvæ of the boll weevil injures the cotton boll is indicated by this photograph. The ravages of this insect cost this country annually 25 cents apiece for every man, woman and child.

fifty per cent of the insects and diseases now destructive to our agriculture and forestry are introductions, most of them unnecessary.

Typical examples of these introduced pests, in relation to general agriculture, are the Hessian Fly, introduced from Europe in revolutionary times and now occasioning an average annual loss to the wheat crop of approximately \$50,000,000, and in some years this loss has exceeded one hundred millions; the alfalfa weevil, a compar-

RESOLUTION

Passed by the International Forestry Conference of the American Forestry Association, January 18-19, 1917

In view of the spread of diseases and insect pests introduced from foreign countries, such as the chestnut blight, gipsy moth and white pine blister.

Resolved

That the American Forestry Association favor the principle of absolute national quarantine on plants, trees and nursery stock, to take effect at the earliest date which may be found economically expedient.

already largely accomplished of the larch timber of the United States and Canada, and the gypsy and brown-tail moths, which have long ravaged the forests of New England and have been the occasion of the spending of many millions of dollars in control efforts and of losses proportionately vastly greater. For mere control alone, the Federal Government has carried an appropriation for many years now of over \$300,000 a year to aid the States in the work

against these insects. Other notable forest and shade tree pests are the spruce twig moth, comparatively recently introduced, the leopard moth, and the elm beetle.

These are merely examples of a vast horde of introduced insect pests. Upwards of a hundred distinctly important injurious insects to agriculture and forestry have been thus introduced, and, in addition to these, hundreds of other minor insect pests. The total loss occasioned by these introduced insect pests to our national forests and farm crops, etc., probably exceeds \$500,000,000 annually.

Losses correspondingly large are chargeable to introduced plant diseases. Familiar examples of such introduced diseases are, the chestnut blight, which has already destroyed the chestnut forests over much of the eastern United States and threatens the existence of the entire native chestnut growth of the country; the white pine blister, a disease already widespread in the eastern white pine area and which ultimately will cause enormous loss to all white pine forests, and which losses will be vastly increased should it spread to the great white and five-leaved pine forests of the Rocky Mountain and Pacific Coast States. Introduced diseases affecting cultivated plants include such important examples as the common scab of the potato, of almost universal occurrence in this country and occasioning tremendous shrinkage in the value of this important crop; the wheat rust, which in

bad years may practically wipe out the entire wheat crop of large sections, as was the case last year in Red River Valley; and a corn mildew recently introduced and already accomplishing very serious losses in the South. Among diseases affecting fruits and fruit trees, the most notable example is the citrus canker, a disease recently introduced from Japan or Asia, and threatening the very existence of much of the enor-



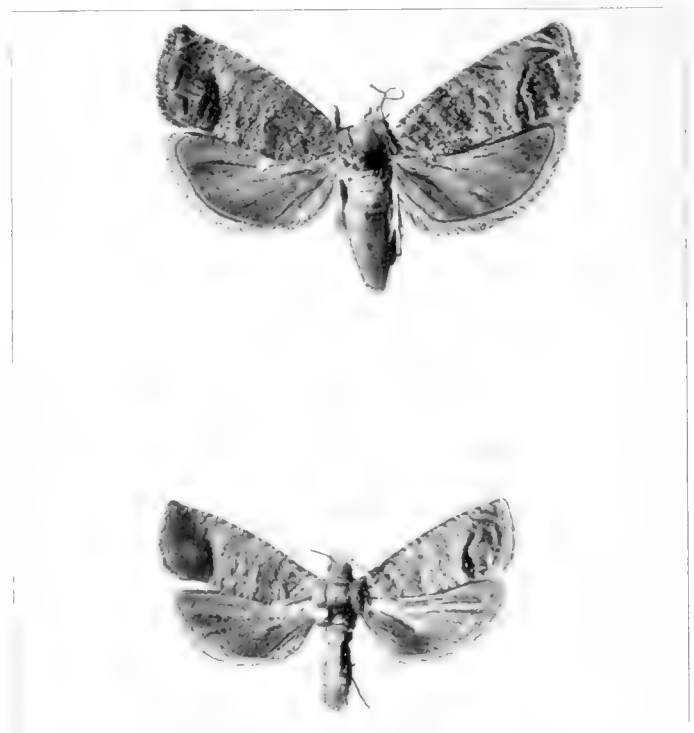
STOPPING THE CODLING MOTH

An apple tree banded in order to collect the larvae of the codling moth so that it may be destroyed.



THE BROWN-TAIL MOTH (*EUPROCTIS CHRYSORRHOEA*)

The brown-tail moth was imported by a Boston florist about 26 years ago on roses from Holland and France. It is a serious enemy to the orchard, forest, and shade trees, and ornamental shrubbery, and has long been recognized as one of the worst orchard pests of Europe. The hairs on the caterpillars produce the brown-tail rash, often causing considerable annoyance to the residents of infested districts.



THE CODLING MOTH (*LASPEYRESIA POMONELLA*)

The codling moth, or apple worm, occasions a loss, in cost of spraying trees and injury to the fruit, of sixteen million dollars a year in the United States.

mous citrus development of Florida and the Gulf Coast, a disease which Congress has joined with the States in an active effort to exterminate with the aid of a large appropriation. In addition to these more important diseases, many minor plant diseases have also been introduced.

While, therefore, much of the original advantage which the western hemisphere enjoyed from freedom from plant pests has been lost, there are still vast numbers of foreign insect pests and plant diseases with large capacity for harm which have fortunately not yet effected successful lodgement in North America or have obtained only limited foothold and may still possibly be exterminated.

For the information of Federal and State inspectors the experts of the Department of Agriculture have prepared descriptive lists of the known plant enemies of the world, insect and fungous, which have not yet reached the United States or become permanently established therein. A manual describing the dangerous insects likely to be introduced into the United States, prepared in the Bureau of Entomology of the Department of Agriculture, and

PESTS DETECTED LAST YEAR

According to the report of the Federal Horticultural Board of the United States Department of Agriculture, one hundred and ninety-three different kinds of insects which might prove hurtful to American crops and one hundred and sixteen plant diseases of similar significance were detected by State and Federal inspection during the last fiscal year on plants and plant products offered for import into the United States.

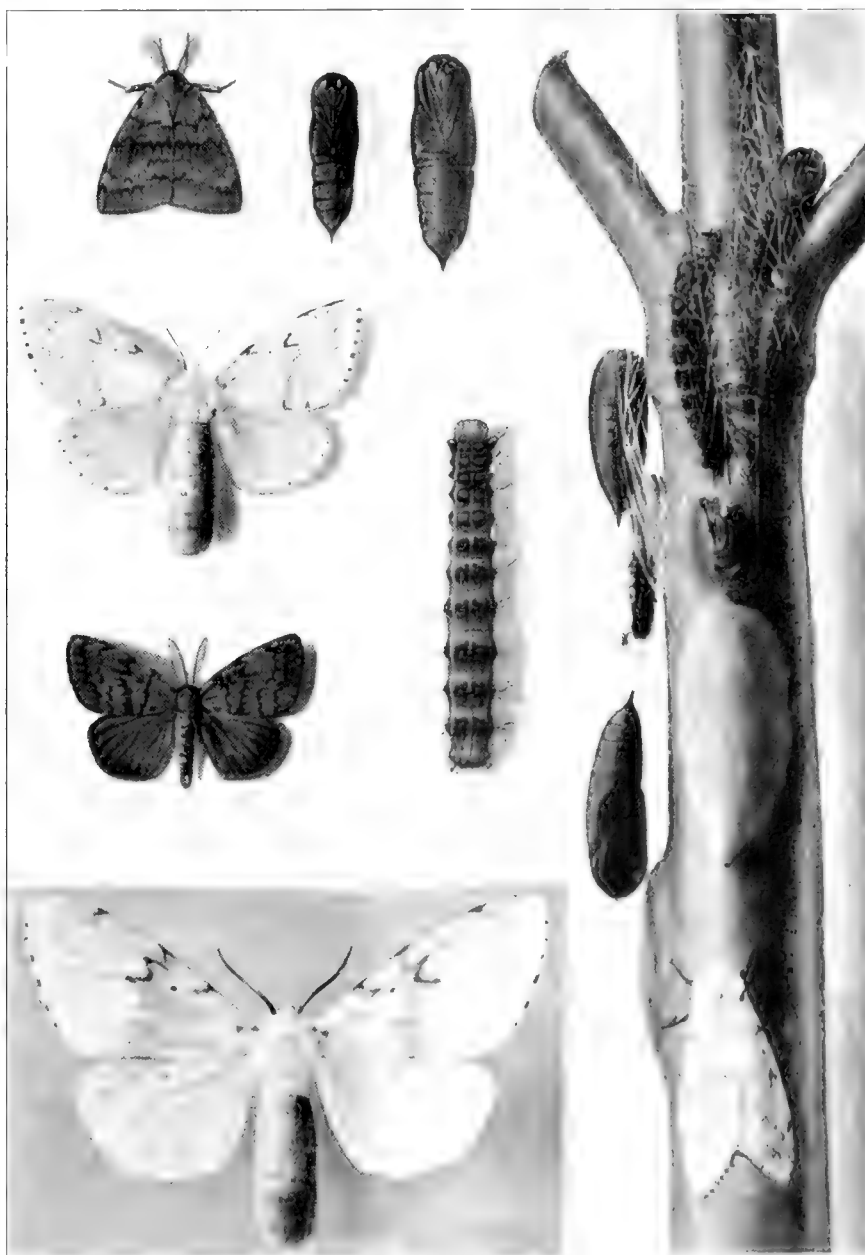
Of the insects, fourteen were scale insects, such as Pear Scale, though they range from scales found on Orchids, Cocoonut, and Bamboo to other forms found on Wistaria, Camellias, Hemlocks and Pines. In addition, nests of the Brown-tail Moth, egg masses of the European Tussock Moth, pupæ of the Dagger Moth, and cocoons of the Pine Sawfly were discovered.

Of interest was the finding of a fourth potato weevil in the United States, which was discovered in Irish potatoes imported from the Andes. Of the diseases, Citrus Canker was found in a number of shipments, and the finding of Powdery Scab on wild potatoes from the east slope of the Andes is taken to indicate clearly that it is the home of this disease of the potato.—EDITOR.

now in press, lists and describes over three thousand distinct insect pests. Probably half of these are old-world insects injurious to forest and shade trees, and the balance, insects injurious to various cultivated crops. A similar manual is in preparation on the fungus diseases of the plants likely to be introduced into the United States.

Among the important insect pests thus listed, which we hope to exclude from the American continent, are such notable examples as the Mediterranean fruit fly, perhaps the most destructive of all fruit pests; and the pink boll worm of cotton, recently spreading from India to Egypt and thence to practically every other cotton-producing country of the world except the United States—an insect capable of doing vastly greater damage than the boll weevil. Among forestry insects occur such notable pests as the "nonne" moth of Europe, which is as destructive to conifers as the gypsy moth is in this country to deciduous trees; and many other forest caterpillars and bark-boring and wood-boring insects.

There are also known to occur in foreign countries



VARIOUS STAGES OF THE GYPSY MOTH (*PORHETRIA DISPAR*)

The gypsy moth is one of the worst forest pests of Europe. It was accidentally introduced into Massachusetts 40 years ago, and has now spread to the adjacent States of Connecticut, Rhode Island, New Hampshire, and Maine. It has been recently brought into this country on imported stock and taken to such widely isolated points as Louisiana and Ohio. There is grave risk of its becoming distributed over the entire United States. It has already cost in New England, in mere efforts at control, a good many millions of dollars, and should it become well-spread in the United States, damage from it would be beyond calculation.



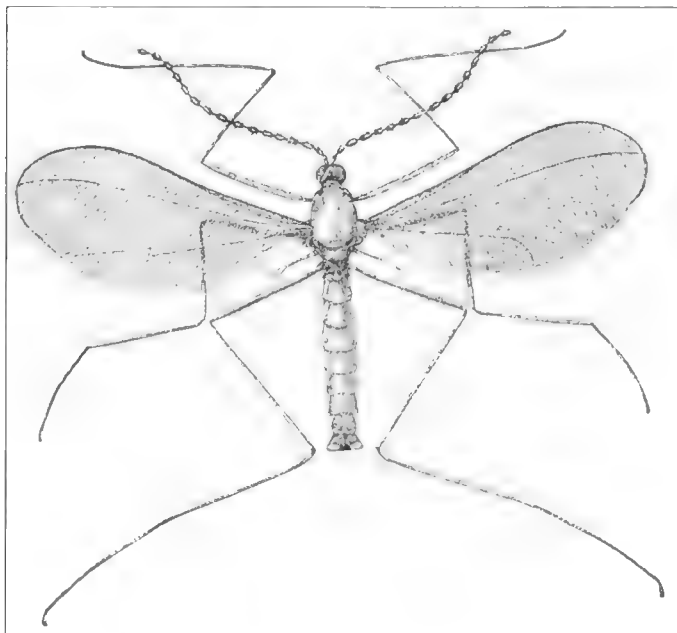
THE GYPSY MOTH PARASITE

These two wagonloads are an importation of gypsy-moth caterpillars from France in 1909, en route to the laboratory at Melrose Highlands, Massachusetts. These caterpillars were brought into this country for the purpose of introducing beneficial parasites to assist in controlling the gypsy moth.

many important diseases of plants which have not yet gained foothold on this continent. Prominent among these are the mildew diseases of the Indian corn occurring in the Orient; the potato wart, and many others affecting cultivated plants and forest trees.

DANGERS FROM NEW REGIONS

The increasing commerce of the world with the hitherto little explored regions of China and other Asiatic countries and Africa, Oceania, etc., adds enormously to the

ADULT MALE HESSIAN FLY (*MAYETIOLA DESTRUCTOR*)

When excessively abundant this insect either destroys or badly injures hundreds of thousands of acres of wheat, reducing the yield from 50 to 75 per cent. This pest alone probably causes an annual loss in the United States of fifty millions of dollars.

risk of the importation of new pests. We know very little of the injurious insects of these new countries, but the importation of new stock in the last few years from these regions by the Department of Agriculture and by private agencies has especially demonstrated the existence therein of many very dangerous plant pests. The importance of these may be illustrated by referring again to some important pests now established in this country from these hitherto little explored regions of the old world. In this list comes the San José scale, the chestnut blight, citrus canker, and the corn mildews, introduced into some of our Southern States.

EXCLUDING THE PESTS

The more important of these known foreign pests are being excluded by regulating the entry of nursery stock, or, in the case of diseases, by an absolute prohibition of

THE FLUTED SCALE (*ICERYA PURCHASI* MASK)

Introduced from Australia and at one time threatened the entire citrus industry of the Pacific Coast. Fortunately, through the introduction and establishment of its natural ladybird enemy, *Novius cardinalis*, this pest is now under control, resulting in the annual saving of hundreds of thousands of dollars to the citrus growers.

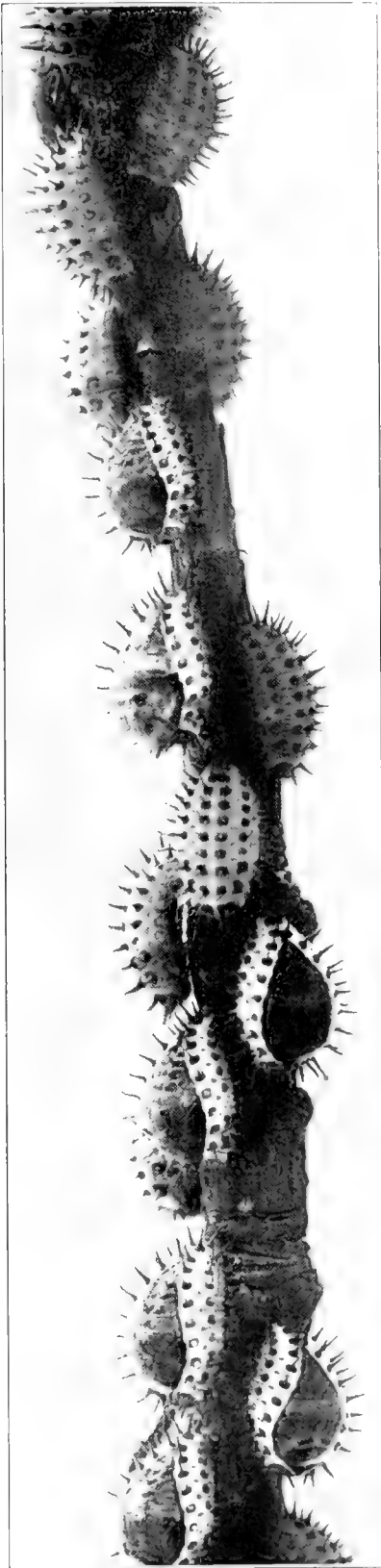
the entry of the plants or fruits affected. There are now in force nine foreign plant quarantines forbidding the entry into the United States of various plants and plant products to prevent the entry of new and dangerous pests. Two of these have relation to forest pests, namely the white pine blister rust and the European pine shoot moth. The others relate to the potato wart; the Mexican fruit fly; the pink boll worm of cotton; the avocado weevil; certain injurious insects and fungous diseases of the sugar cane; citrus canker and other dangerous citrus diseases; and the downy mildews and *Phytophthora* diseases of Indian corn.

This Act also gives power of control within the United States of new and dangerous plant pests by quarantine or regulation of movement. This power is, however, now

limited by the necessity of actually determining the presence of the insect or disease to be quarantined against in the State or district made subject to the quarantine. An enlargement of this power to be able to effectively quarantine against such a widespread disease as the white pine blister rust is now being sought.

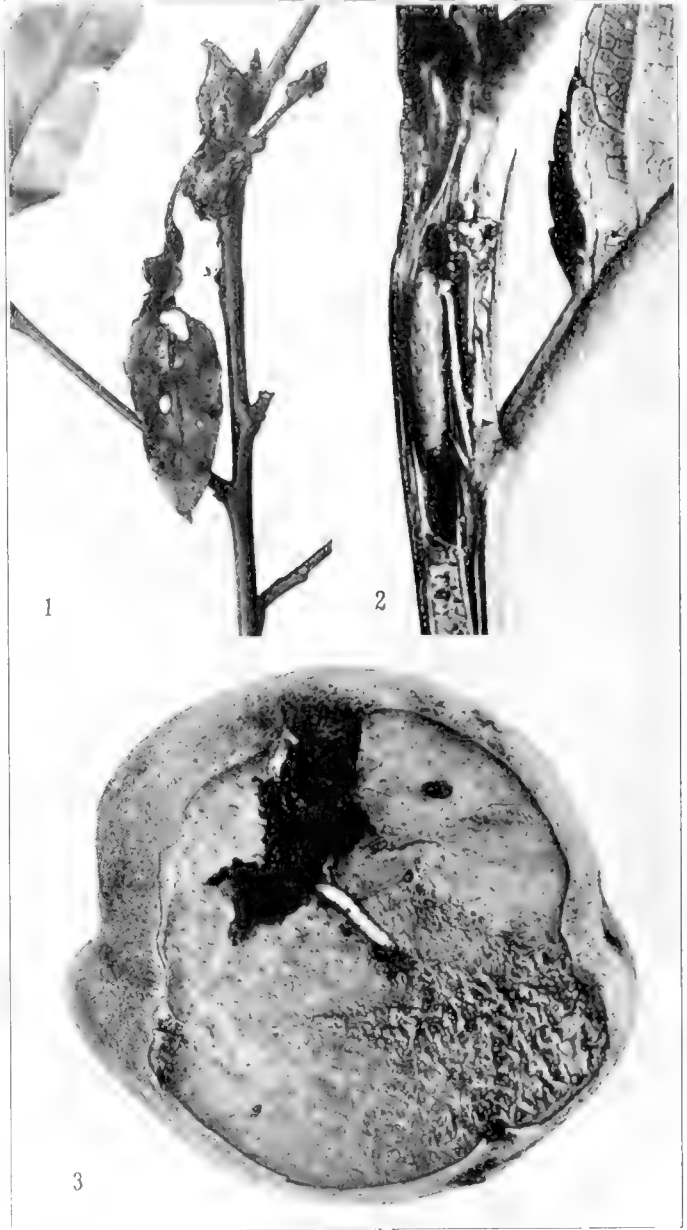
The powers of this act in relation to the exclusion of foreign plant enemies has hitherto been directed towards specific dangers which could be shown by the Federal or State experts in relation to particular plants or plant products. In view of the tremendous losses which are now being occasioned by introduced plant pests and the additional losses which are now threatened by the many new plant pests likely at any time to be introduced, as herein shown, it is perhaps opportune now to seriously consider the advisability of very much restricting the further entry of all foreign plants and plant products capable of being the agency of such introductions; in other words, to put all such introductions under definite Federal con-

trol and supervision, with power of exclusion wherever a reasonable risk is known. This need is emphasized just at this time by a number of important illustrations, already alluded to, of recently introduced pests, including the pine blister rust, chestnut blight, citrus canker, pink boll worm of cotton in Mexico, and a new peach pest from Asia which has scarcely yet come to public knowledge



PUPATING LARVÆ OF THE ASIATIC LADYBIRD (*CHILOCORUS SIMILIS*)

This beneficial insect, which is a voracious feeder on the San Jose scale in China and Japan, was introduced into the United States to assist in the control of this scale insect, and is helping to prevent destruction amounting to several hundred thousand dollars a year.

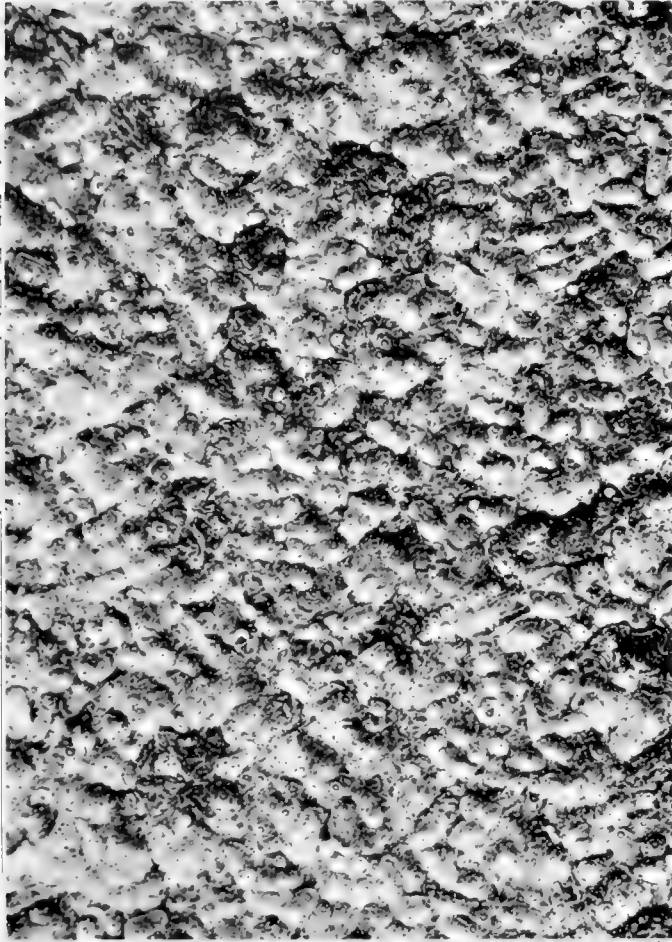


AN IMPORTANT NEW INSECT ENEMY OF THE PEACH
(*LASPEYRESIA MOLESTA*)

Observations during the summer and fall of 1916 seem to indicate that another formidable insect enemy of the peach and other deciduous fruits has become established in America. Larvæ of this insect have been observed injuring the twigs of peach, plum, cherry, and fruit of the peach. No. 1 shows a peach twig with a mass of dried gum and leaf fragments due to attack by the caterpillar. No. 2 shows a peach shoot cut open exposing the larva in its burrow. No. 3 shows the cavity excavated in the peach by larva entering at the side.

but which threatens our peach crop with greater losses than perhaps any of the older established peach pests. It would certainly appear that the enforcement of much more restrictive measures than are now possible is amply justified.

In this connection, and in relation to the natural desire to accumulate from the ends of the earth new field plants for our agriculture, and new fruits for our orchards, and the novelties and curiosities of the plant world for our gardens, lawns and parks, it must not be lost sight of that we have first to consider the safeguarding, that is, the conservation of the big commercial crops of America



THE SAN JOSÉ, OR CHINESE, SCALE (*ASPIDIOTUS PERNICIOSUS*) ENLARGED

Probably no other insect has received so much notoriety as this species. Its international importance is indicated by the vast amount of interstate and foreign legislation which has been enacted relative to it. Millions of dollars are expended annually in efforts to control this pest, which is so injurious to deciduous fruit trees.

such as wheat, corn, cotton, potato, apple, peach, orange, etc., and our enormous natural forests which are and must always remain our chief productions. The risk to these standard products of our soil with all introductions of allied or varietal plants, and especially such plants from the hitherto little exploited portions of the earth, is enormous, as the illustrations already given have shown; and therefore all introductions should be preceded by studies and explorations to determine the risk, if any, in advance of the importation; and such importations should, furthermore, be surrounded with all restrictions and safeguards necessary to prevent the entry therewith of new plant enemies. In other words, the safeguarding of our big established productions should be the first and leading consideration.

NATURAL GRAFT ON CORK ELM

By Guy Caldwell

DOES any lover of trees pass by a phenomenon known as natural graft without entertaining the wish to know just what accident or set of circumstances evolved to bring about the fortuitous growth? The cork elm (*Ulmus racemosa*) herewith was pointed out by the owner, Mr. Brockenbrough, on his summer place near Richmond, and its clean, healthy condition, together with the unusual symmetrical lines dividing the trunk with such nicety at once called forth admiration for the wonders of



NATURAL GRAFTING

This elm, on the summer place of J. M. Brockenbrough, near Richmond, is attracting considerable attention. The man in the picture is Guy Caldwell of Richmond, a tree expert.

nature. It is an interesting speculation to try and imagine just what incident in its life's history caused the union of these young branches after they had previously come to the parting of the ways. Perhaps they believed that "In union there is strength."

TREES WITH A HISTORY

IS there a tree with a history in your town? What do you know about it? Is it being cared for or is it being allowed to die? **AMERICAN FORESTRY** would like to know about such trees and would be glad to receive pictures and articles not to exceed 100 words about such trees. Such as are available will be printed in the magazine from time to time.

ADDRESS BY PRESIDENT CHARLES LATHROP PACK

In welcoming the members of the American Forestry Association, attending the Thirty-seventh Annual Meeting, and the United States and Canadian delegates to the International Forestry Conference at Washington, D. C., January 18 and 19, 1917, President Charles Lathrop Pack of the American Forestry Association said:

IN the name of The American Forestry Association, I welcome you to this Forestry Conference at Washington. You have come hither in answer to our invitation. Some of you have come long distances, and many have done so at the cost of considerable personal inconvenience. You are here to consider some of the vital questions of forest conservation, and the better protection and use of this great fundamental resource of the United States and Canada. Among the delegates appointed from Ontario and Quebec and from each of many States of this country, we recognize many familiar faces. You are experts in forestry and natural resources, and representatives of National and local organizations concerned in the development and use of the forests. Coming from Canada and from many States, this Conference is, in effect, a meeting of the representatives of the citizens of these States of the Nation and of the people of Ontario and Quebec.

THE FOREST AND PREPAREDNESS

This is a trying time with those who would protect the forest. New enemies are at work, and you are here to devise plans, ways and means to better protect the forests and better keep and use the great timber resources, which are so valuable and necessary to the economic progress of the United States and Canada. The conservation of the forests is an important factor in National preparedness in this country. If the great test of war comes to our people, it will be as vital to have natural resources available as to have men and ammunition.

We must have natural resources in abundance back of our Navy and our Army for adequate defense. The life of a Navy and of an Army would not be safe without it, and conservation, particularly of the forest and the mine and the soil, is a constructive principle essential to the end that we may be prepared.

I will not undertake before men of your wisdom and experience to discuss any of the details of the important questions you are here to consider. These will be taken up during your deliberations, and I congratulate you on the program you are to hear and consider.

THE WHITE PINE BLISTER

Expert investigation has established that the white and other five-leaved pines of the United States and Canada are threatened by the white pine blister, a fungus disease imported from Europe. Already the disease has been found extensively in New England and in most of the Eastern and Northern States of the white pine belt, and to some extent in Ontario and Quebec.

What you may here consider and determine will have a large influence and effect for better or worse on the future of the white pine, which is admittedly

our most valuable northern lumber tree, as well as one of the most beautiful. I need not urge upon you the importance of your deliberations.

THE WAR AND FOREST ECONOMICS

The great war in Europe has increased the importance of the economic value of the forest. Germany has ever been in the lead in the practice of dealing scientifically with these matters. One of the interesting mysteries of the present conflict is the source from which the Central Powers obtain the nitro-cellulose necessary in the manufacture of smokeless powder. This, as you all know, is ordinarily made from cotton. Germany does not now have access to the world cotton market. We have information which would indicate that in this emergency the nitro-cellulose used now by Germany is made from wood. The ordinary black powder is composed of fourteen to eighteen parts charcoal, made from certain varieties of wood. For strategic purposes, of course, smokeless powder is preferred on the battle-fields, but very great quantities of black powder are consumed daily by the contending armies.

We refer to rosin and turpentine, so largely the product of our Southern pine forests, as "naval stores," but now rosin is employed in large quantities in filling the space between the bullets in shrapnel shells, so that when the shells explode the missiles will be evenly distributed in all directions.

Gun-stocks, formerly made almost entirely from walnut, are now made from birch, red gum and other woods. Millions of such have during the past few years been made in America. The peculiar style of warfare which the great war has brought forth, necessitates the use of enormous quantities of timber for trench walls, trench floors, braces and stays. Millions and millions of feet are required for buildings behind the fighting lines, for hospitals, for housing non-combatants, for temporary storehouses and the like. Enormous quantities of forest products go into mine props, bridges and for other military preparations.

The ingenuity of Germany has taught her to make a soft and satisfactory absorbent as a substitute for absorbent cotton for surgical uses, and it is made from wood fiber or cellulose. Nowadays, enormous quantities of cordage and ropes and burlap, rugs and carpets are manufactured from wood fiber and wood pulp. Some may not know it, but many a person, even in this audience, is wearing articles of clothing that are now made wholly or in part from wood fiber. Some beautiful fabrics for ladies' evening wear are made largely of wood fiber and cellulose. The new uses and the increased old uses for the products of the forest increase the economic value of the forest, and add to the importance of all the questions

you are here to consider. The effect on the cost of paper is far-reaching, and of great economic consequence.

Germany was well prepared for this World War, and part of her economic preparation was seen in the fact that she has been unequalled in the perfection and practice of forestry. The care for years with which Germany has protected her timber, and her laws not only compelling in effect the replanting but making replanting profitable and, therefore, economically possible, are among the things that stand out in clear relief from the viewpoint of preparedness.

NO IMMEDIATE DANGER OF SERIOUS LUMBER SHORTAGE

There is no immediate danger, if we use our forests rightly, of a serious shortage

in our lumber supply, but the time is here when the conservation of our forest resources demands more serious and real economic consideration. It seems to me that the conservation of our privately-owned forest resources will never really become effective on a sufficient scale, until there is a prospective profit in practicing forest conservation.

Our great National forests, now under Government administration, should be supplemented to a greater extent by State and Municipal forests, as only the Nation, State or the Town can afford to hold forest lands in reservation, the cost of tax exemption forest management, and protection being a burden of all the people, and these properties thus free from the often heavy local taxation of privately-owned forests should be largely held in reserve until logs at the saw-mill are worth the cost of raising the crop.

CONSUMPTION AND PRICES OF LUMBER

The official Government figures show that the lumber manufacturer in 1915 received 10 per cent less per thousand feet for his product than in 1906. The average of lumber prices in 1916 at the saw-mills will average little more than those of 1915, and at Southern pine mills not as much as the prices of 1913; and this when the average citizen of this country uses over 400 feet of lumber yearly—more extravagant in the use of lumber than the people of any other land. The best estimate of lumber used in 1916 in the United States was about 42 billion feet as against 38 billion used in 1915.

The forest and lumber industry is the greatest of our

industries which has not greatly benefited by the World War. There are no war brides in the shares of Lumber Companies. Such low prices for lumber at producing points—away below the costs of reproduction through forestry methods—are against the interests desiring the conservation of these resources. You can't continue to have your cake and eat it too, when you buy your cake at less than the cost of raising the grain and sugar.

The values of the trees in the forest—stumpage values we call them—have in recent years steadily increased, but even at present prices forest trees at the source are the most reasonable crop that grows—cheaper, I believe, than wheat at 25 cents a bushel, or corn at 10 cents a bushel, or cotton at 5 cents a pound. Suppose that cotton or grain were century plants, like large pine trees; it would require a comptometer to compute the price of bread for breakfast.

You can't produce a dense population of men and a large stand of pine, or hard wood, on the same land. We raise a useful man in, say, twenty to twenty-five years. It takes very much longer to raise a tree useful for wide boards or timber. A boy usually produces little or nothing until he becomes of age. This is equally true of the tree raised for lumber of considerable dimensions. We have been a happy people in consuming forests that were here before we came, but now we must realize that timber like other crops must be worth the cost of production.

A BETTER PUBLIC UNDERSTANDING

A striking indication of a better understanding by the public of the problems in forest ownership and lumber production is given by the report of the Special Committee on Natural Resources of the Chamber of Commerce of the United States, which, through Referendum No. 17 of that organization, recommends legislation to permit coöperative agreements under Federal supervision in those industries which involve primary natural resources on conditions that the agreements tend to conserve the resources and promote the public interest. When trade organizations representing every phase of American industry vote in favor of these recommendations—as they have done—it is a most hopeful sign for an ultimate conservation of our natural resources through wise use.

THE announcement of the short practical courses in forestry and lumbering that will be given by the University of Washington, at Seattle, has just been sent out. These courses extend from Jan. 3 to March 30. Dean Hugo Winkenwerder, of the college of forestry, is in charge.

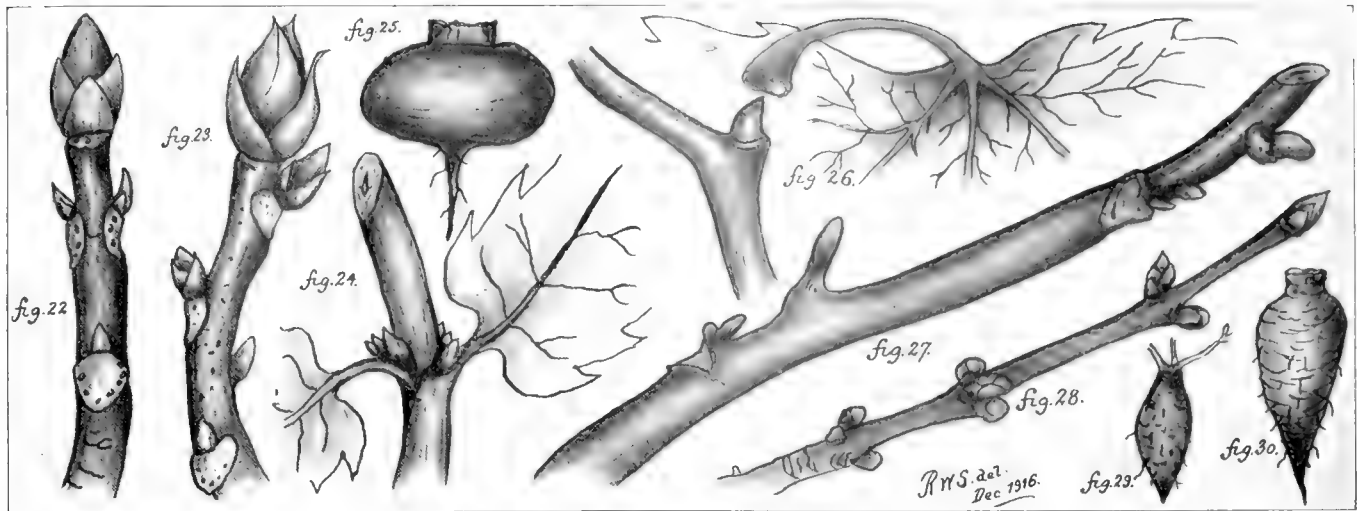
As these are short practical courses and arranged especially for young men who have not had a high school education and who can not afford to spend a long time at the university they offer an exceptionally good opportunity, for men regularly engaged in some form of woods work, and for those who intend to enter such work, to get a practical education.

* * * "This year we are increasing the work in the special course in 'Lumber and Its Uses.' This course is outlined with special reference to presenting this information for the use of persons engaged in office work at the sawmills, lumber salesmen, architects, engineers, builders and building inspectors."

TESTS at the Forest Products Laboratory, at Madison, Wisconsin, indicate that by the use of four additional nails in each end an increase of 300 per cent in the strength of canned food boxes is secured.

APPROXIMATELY 10,390 acres of denuded lands within the National Forests were reforested in the fiscal year 1916. The total number of trees planted was 6,146,637, while 8,280 pounds of tree seed were sown.

THERE were 133,442 more cattle and horses, and 605,338 more sheep and goats using the National Forests in 1916 than in 1915. This increase was in spite of large eliminations of grazing lands from the Forests. It is accounted for by improved methods of handling the stock and by more intimate knowledge of the forage on the ranges and their carrying capacity.



THE ILLUSTRATED GLOSSARY—BUDS AND ROOTS

Figure 22, one-year old horsechestnut shoot, autumn specimen, after the leaves have fallen; this shoot shows a *terminal bud*. Terminal buds are found on the *ends* of the stems and twigs of certain trees, shrubs, and herbs, and through their evolution and growth the prolongation of the stem takes place. They may easily be studied in the spring in the case of many trees, as the maple (Figure 28), the hickories, and the present subject. Below the terminal bud, on the sides of the stem or twig, we may notice certain small, triangular, naked places. Here is where the leaf-stalks came away the previous autumn. On the upper margins of these areas small buds are discovered; these are called *axillary buds*, as they occupy the axil of the leaf—the place where the leaf is attached to the stem. These axillary buds have a regular arrangement down the stem, as shown in the drawing; and in the case of the destruction of the terminal bud, a number of them may grow to become branches. In many shrubs and trees these buds do not start to grow until spring opens up, while in the sycamore (Figure 26) they may be covered all summer by a cup at the end of the leaf-stem (base of the *petiole*). In this connection, study Figure 6 of this article. Sometimes, as in certain honeysuckles, several of these axillary buds are grouped together, and when this is the case they are termed *accessory* or *supernumerary* buds. This is also found to be the case in various trees, as in the butter-nut (Figure 27), and here we find that one of the axillary buds is larger than the others, being removed to a point above them on the stem. In the red maple,

however, the axillary buds are seen to be placed side by side (Figure 28). The study of *buds* is extremely interesting, not to say important. Besides the above-mentioned *axillary* and *accessory* buds, we may also have *adventitious* buds, or those that do not occur regularly in the axils, but appear in other places on the stems in no regular order; they may be found even on leaves and roots. *Adventitious* buds may be *scaly* or they may be *naked*,—that is, without scales. Those that develop into leaves are called *leaf-buds*, but when they do not contain leaves but latent blossoms, they are termed *flower-buds*. One of the best ways to study buds and their development, is to watch them from day to day as they grow in the spring and early summer on plants, trees, and shrubs.

In the next month's *Illustrated Glossary* the subject of *roots* will be taken up; their terminology is quite as extensive as that of buds. Good examples will be given of those that are termed *fleshy roots*, such as carrots, parsnips, turnips, and radishes. Their simple, fleshy enlargements are really store-houses of food for the growing *perennial* or *biennial* herb. When such roots are broad and shallow, resembling some tops in form, they are called *turnip-shaped* or *napi-form* roots (Figure 25); when they are elongate or cone-shaped, as in many species of carrots, beets, and parsnips, they are termed *conical roots* (Figure 30). Finally, we have the *fusiform* or *spindle-shaped* roots, or those like some radishes, which are more or less pointed at the extremities and enlarged at their middles (Figure 29). Still other kinds of roots will be taken up in a future number.

EARLY SAXIFRAGE, BLOODROOT, AND JACK-IN-THE-PULPIT

BY DR. R. W. SHUFELDT, C. M. Z. S., EDITOR OF THE DEPARTMENT OF FLOWERS

AS winter retreats northward before the steady advance of the ever-increasing warmth of approaching spring, we have a season at hand that rivals any other time of the year in which to ramble over fields, and tramp through the woods with our collecting outfit. Every part of the latter, since the days of the preceding autumn, has lain neglected in some corner of the naturalist's sanctum, patiently awaiting the advent of the first bird migrant; the awakening of the earliest flowering plants; the chirruping of the merry cricket frogs in the ponds and ditches, and a thousand other happenings afield, which, combined, render this vernal season the most delightful of the year. An April-tempered breeze sends the dried and tan-colored fallen leaves of the previous season scurrying before you along the edge of the oak and chestnut woods, exposing here and there a patch of bright green fern leaves; a spray of early arbutus; a few brilliant partridge berries, not to mention a dozen other peeping sprouts of as many different kinds of growing things, making ready to put in as early an appearance as possible.

Ah! There are some charming little Spring Beauties surely they have been in bloom for a week at least. We all know them; and some of us may even remember that they were named *Claytonia* in the honor of that good, old, American botanist, John Clayton, while the two species of the

genus have received the names of States, being known as *Claytonia virginica* and *Claytonia caroliniana*. But these must be described some other day; for right here, in this deep ditch to my left, I spy the first specimens of Early Saxifrage seen thus far; so my faithful, old-time, five by eight camera is brought into position, and the result here reproduced in Figure 1 is secured. Like the Spring Beauties, Early Saxifrage—the two best-known species of it—is found in suitable localities over most of the upper half of the United States, and have been named specifically for States, as *Saxifraga virginicensis*, and *Saxifraga pennsylvanica*. As a family, however (*Saxifragaceæ*),—that is the Saxifrage family,—it is more extensive than this; for it contains in the genus a very large number of herbs and shrubs. They are related to the Rose family (*Rosaceæ*), and are represented by the Mitreworts, Alumroot, and their various allies. Asa Gray, for example, describes an even dozen species of Saxifrage for us in his last "Manual": while in some of the earlier botanies only two species are mentioned—the ones named above.

Saxifraga, be it known, is compounded of two Latin names: *saxum*, a rock, and *frangere*, to break or fracture; this for the reason that the plant is often seen growing in the clefts of rocks in the woods. From this fact, some botanists go so far as to say that they always grow in such clefts; while, much to my surprise, I find that we still

have writers on flowers among us who actually believe that the roots of this delicate little plant rend the rocks asunder. Even the close observing Germans call it a "stone-breaker" (*Steinbrech*), while Alice Lounsberry says, in her "Guide to the Wild Flowers," that "we find

dead leaves, semi-frozen ferns, and frost-nipped vegetation of the year before, with not a single sign of a rock in the neighborhood.

Noble Blanchard believed no such tale, for she says of the Early Saxifrage, "Rooted in clefts of rock that, there-



WHERE SAXIFRAGE THRIVES
(Slightly reduced)

FIG. 1.—Early Saxifrage (*Saxifraga argentea*), one of the first flowering plants of the spring, sometimes appearing as early as the first week in March; they grow to be from four to ten inches in height. The dark-green leaves are arranged in a rosette near the ground. Their foot-stems are short and broad, while the leaves themselves are oval in outline, rounded distally, with scalloped edges; they are smooth and somewhat thickish. Petals white, five in number, the flower being small, with ten bright yellow stamens. Stem stout and downy; rises from the middle of the leaf rosette. As the main stem lengthens, the separate flower-stems branch and elongate, until the growth as a whole has a much looser appearance and actually is more spreading on this account. The flowers may remain in bloom for two or three weeks, during which time different species of bees and two or three species of butterflies perform the required cross fertilization.

it on the top, or in the clefts, of rocks, which it has been known to break asunder. In fact, to watch this little plant is a moral lesson in the achievements that can be brought about by quiet will power." Of course, this is but a fabulous tale, and our pretty little plant plays no such part in nature. Indeed, I have far oftener met with it growing in just such situations as I photographed it in on the sides of a deep ditch, coming up among the



FLOWERING BLOODROOTS (*SANGUINARIA CANADENSIS*)
(Slightly reduced)

FIG. 2. A white petalled, yellow-centered flower of general range in eastern United States. It is entirely without odor, and grows, as seen in the illustration, on a naked stem of no great height. Pistil single, stamens numerous. This curious plant has but a single leaf that springs from the fleshy root-stock close to the base, the latter containing the same kind of red juice that is found in the stem. There is a short style and a two-grooved stigma, while the ellipsoidal pod is one-celled and two-valved. The seeds are conspicuously crested. In Europe and in north in Asia this low, perennial plant is called the "tormentil," and its juice, which is rich in tannin, is medicinally used as an astringent. Housewives in this country often keep a small bottle of it on hand to drop on sugar, and children are given this when suffering from colds. In general medicine its alkaloid, *sanguinarin*, is sometimes employed as an expectorant, an emetic, or even as a stimulant.

fore, appears to be broken by this vigorous plant, the saxifrage shows rosettes of fresh green leaves in earliest spring and soon whitens with its blossoms the most forbidding niches." This is distinctly contradicted by Ellen Miller and Margaret Christine Whiting, in their "Wild Flowers of North-Eastern States," when they say: "The roots of this hardy plant, pushing in among the crevices of the rocks, fracture them by their vigorous growth." And so

it goes. It would be quite an interesting point to settle, when Early Saxifrage appears this spring, were some reader of this controversy, as I have presented it here, to photograph a growing specimen of this plant in some rocky crevice, where it might prove or disprove this variance of opinion among botanists at the present time.

Early Saxifrage blooms from the first week in March to well into May in the middle of its range, the plant occurring as far north as New Brunswick, thence southward to southern Georgia, and westward through the valley of the Mississippi. F. Schuyler Mathews tells us that "the buds are formed early, and appear like little (fine-haired) balls in the center of the rosette-like clusters of obovate leaves close to the ground. Eventually a cluster expands to a branching, downy stem (Fig. 1), bearing many little white, five-petaled, perfect flowers, with ten yellow stamens. The flowers are succeeded by rather odd and pretty madder purple seed-vessels which are two-beaked; often the color is madder-brown." Mathews is another botanist who distinctly denies that the roots of this little plant have the power to fracture rock; at least he says so of the Swamp Saxifrage, which is, by the way, a larger plant with greenish-white flowers.

THE BLOODROOT

About a week or ten days after the Early Saxifrage is in full bloom, we have the advent of another of our most lovely, not to say most interesting, wild flowers of spring, the Bloodroot, associated with all that the early spring woods have in store for us. The picture, Figure 2, presents a whole lot in the history of this famous plant. In the first place, it shows at least one kind of locality in which they flourish; it is on the almost vertical bank of a miry ditch, where I disturbed not a single dead leaf, twig, or

stick before making the exposure. We see here the flowers of the bloodroot in every stage of their development, as well as their gradual departure after enjoying the most transitory existence, which is more transitory, mark you, than that of any other early flower of our forests and glades. Note the gorgeous specimen in full bloom; the two that are losing their glistening white petals, and the one between them where all the petals are gone but one. Above these we see the two opening buds, and a closed bud between them, nearly shut out of sight.

We have but one species and one genus of Bloodroot in our flora. As *Sanguinaria canadensis* it has been arrayed among the poppies or in the Poppy family (*Papaveraceæ*). As every one who has ever picked a Bloodroot knows, the juice of the plant is of an orange-red color, hence its name—generic name—*Sanguinaria*. In former times, this juice was much in use by some of the American Indians as a stain for their faces, and for certain of their trappings, tomahawks, and arrows. It washes off with great difficulty, and I have seen the evidences of it upon children's fingers a week after they plucked the flowers. This will account for other names which have been bestowed on the plant, as "Indian, Paint," "Red Puccoon," and "Indian Plant," with possibly others in other parts of the country where it is found.

Where Bloodroots are seen to the best advantage is upon some dark-soil hillside, sparsely timbered with various trees of the forest. They commence to put in an appearance early in

April, after the first spring winds have blown many of the last year's dried leaves off the most exposed areas in the woods. It is then we note, some fine morning, their first appearance as they send up in many places the first evidence of their awakening. That elegantly curled-up leaf there, enclosed in its tissuey bract,



JACK-IN-THE-PULPIT (*ARISEMA TRIPHYLLUM*)
(Slightly reduced)

FIG. 3.—This is one of those having the dark purple, light-striped spathes, which arches over the still darker, club-like spadix seen within. Between the plant and the poplar tree near it, is seen growing a fine May flower plant (*Podophyllum peltatum*), and the leaves of the two must not be confused. The Indian Turnip has but two, and far above that which many take to be the flower of the plant. Jack-in-the-Pulpit flowers are, however, known to but few observers, for they are exceedingly small, and situated at the base of the spadix which folds around them. Just above where the tiny flowers are found, the club-like spadix becomes suddenly enlarged, thus forming a chamber in which many an insect is entrapped and loses its life. A good account of these tragedies is given in "Nature's Garden" by Neltje Blanchan (p. 368), and it forms most instructive reading for the young botanist. Unfortunately, the story is too long to reproduce in this place.

is a splendid specimen of the plant as it forces its delicate tip into the realm of day, to enjoy its interesting life-cycle. On it comes, straight as an arrow, through the dark soil. When lo! after it has attained a height of some five or six inches, the round, rich, silvery-green and deeply-lobed leaf unfurls, gradually opens out, and exposes to view the treasure it has so well protected. This is nothing less than the future flower—a rather thickish, spindle-shaped bud, which reveals, as soon as it is well above the expanding leaf, its ten or dozen snowy petals, spreading quickly out into a gorgeous star, that may be seen against the dark earth at a long distance, forming, with its many neighbors, a superb floral galaxy indeed.

These delicate flowers last but a very short time—maybe not more than a day or even less; the first stiff spring breeze sends the whitest points in all directions, as it sweeps over the frail band. Still, recruits continue to come up, and bloodroots may be found in one place or another until May is pretty well along—the atmospheric temperature having not a little to do with it.

These flowers secrete no honey, so the insects visiting them leave unrewarded for the important service they perform in the matter of fertilization; bees and certain flies are their chief benefactors in this respect.

Bloodroots close up at night, the closure being accomplished by the petals all rising together, their outer points meeting above the inner structures of the flower, thus protecting them from the chilly air of the nights and evenings of the early spring. This plant is an interesting one to study, if obtained just as its tip appears above ground in the spring, and transplanted to a suitable box filled with rich earth, to be kept on some sunny window-sill at home; in this way all of its peculiarities may be observed at one's leisure.

Spring is now well along in the northern States east of the Mississippi, and many flowers have bloomed and disap-

peared as one of the most remarkable plants we have makes its appearance; this is the Jack-in-the-Pulpit, also called Indian Turnip. It occurs in moist woods, and often along the banks of sluggish brooks and streams in deep, dark woods. Occasionally, numbers of them thrive in

thickets where the ground is moist and soft. Botanists have placed it in the Arum family (*Araceæ*), and christened it *Arisæma triphyllum*, or an arum that is stained as though with blood (Greek). It has but one close relative in our country, the Green Dragon or Dragon Root, found in the same genus—a plant with a history.

Frequently I have photographed the Jack-in-the-Pulpit, both the fruit (Fig. 4) and the flower (Fig. 3), and I have studied this plant under many conditions, in nature as well as in boxes kept in my study. In the Middle Atlantic States we may look for them along in April; and if it be very early, we may brush the dead leaves and sticks aside in the localities where they grow, when, sooner or later, a pale green, sharp-pointed little cone will be seen sticking up in the mire or damp earth. If this be not a May Apple (*Podophyllum peltatum*), it is almost certain to be sprouting Jack-in-the-Pulpit. Right here, my advice would be to carefully take the whole plant up, looking about for three or four other good specimens to go with it, and take them home to plant and study as they develop.

Some should be reared in the sunlight; others in deep shadow, and still others under varying conditions. Notice the root as you plant it; it is called the *corm*, and it is a turnip-shaped affair, rich in farinaceous matter. So bitter is its juice that, if bitten, it will blister the tongue and lips. School-boys call it the "Memory roots," for you are likely to remember it should some young scamp get you to bite it. Boiling removes this acidity entirely, so the early Indians, after thus cooking it, used it as food, as they used the bright scarlet berries which constitute



THE BRILLIANT SCARLET FRUIT OF THE JACK-IN-THE-PULPIT
(Slightly reduced)

FIG. 4.—There are two plants represented here, collected in southern Maryland on the eleventh of September, 1916. These fruit bunches, containing the ripened seeds of the plant, were originally dark green, and very shiny; they only became red upon ripening. If this be done on the part of the plant in the hope that seed-eating or other birds may carry them off, and, finding the berries unfit to swallow, drop them far from the parent plant, where they perchance may start a new colony, that hope is possibly realized, though we have no evidence of the fact. Gnats of the genus *Myelophila* are the insects principally responsible for the fertilization of the Jack-in-the-Pulpit, though probably other forms also are. Mathews says that the plant "is possibly developing a dependence upon insects for fertilization; but often one plant develops both staminate and pistillate flowers." The last word about this member of the Arum family apparently has not been said.

its fruit (Fig. 4). Hence "Indian Turnip," as before noted.

This plant grows rapidly, its erect stem (scape) being pinkish and green as it shoots upwards; and the plants vary greatly in height, from a few inches to a foot and a

sometimes a beautiful pale green, with delicate longitudinal stripes. Again, it is a dark rich purple, with pale yellowish stripes. It is surmised that the former has grown in the bright sunlight, and the latter where they have been deprived of it.

The minute flowers of the Jack-in-the-Pulpit are greenish-yellow in color, and are clustered about the base of the spadix. The arrangement can be easily studied by taking a fresh plant and splitting the hood or spathe, down the side as far as the stem. Doctor Torrey believes that those very light-colored ones, or where the flap of the spathe is very light-colored, are sterile plants, while the fertile ones have the dark purple spathes. This is an opinion at variance with the one expressed above, but it may none the less be the correct one. In any event, late in the summer the ripened seeds form a bunch on the summit of the stem, about as big as a large horsechestnut or larger, being at first of a very dark green color, and later a magnificent and brilliant scarlet, rendering the plant so conspicuous that it may be seen at some considerable distance in the woods (Fig. 4). Additional information in regard to this plant is set forth in the legends beneath Figures 3 and 4.

Personally, I have never collected the near relative of the Jack-in-the-Pulpit, the Green Dragon or Dragon Root (*Arisæma dracontium*); but a good account of it may be found in any general work on our wild flowers. Next summer I will probably be able to present a reproduced photograph of a specimen here.

In the damp woods where we find the Jack-in-the-Pulpit flourishing in the spring, we often come across a great log of a fallen pine tree, or perhaps that of an oak. Upon tearing off the loosened bark of this, all the evidences of the decayed trunk are in view. A large larva is also to be seen in the pulverized, rotten wood and bark, while channels, borings, and grooves run in all directions, having been cut not only by the larva, but by the adult insect itself. These insects are soon to be seen, and many a collector has asked me the name of them. They are known in entomology as the Horn-Bugs or Horned Passalus (*Passalus cornutus*), and very elegant beetles they surely are (Fig. 5).

PENNSYLVANIA TREE PLANTING

THAT the 5,000,000 acres of barren land in Pennsylvania can be reclaimed by reforestation is finally established by reports given out by the Pennsylvania Department of Forestry. These reports cover the planting of 21,000,000 trees on 13,000 acres of State Forest land. Pennsylvania set a record last year when almost 6,000,000 trees were planted in one season, and a single plantation was made which contained over half a million trees. The nurseries will produce many more trees this year, but the work of planting will be hampered considerably by scarcity of labor and lack of funds.

FOREST products of Finland now constitute 70 per cent of the total exports or \$96,500,000 and the government has appointed a committee to look into ways and means for better preserving the forests and enhancing their yield.



(Photograph of living insects by the author. Specimens collected by Master Edward E. Court, near Washington, D. C.)

HORN PASSALUS OR HORN-BUG (PASSALUS CORNUTUS)

FIG. 5.—Four specimens are seen in the illustration, and the forward-projecting, tiny "horn" is plainly seen upon three of them. These beetles belong to the family *Lucanidae*, members of which are known as Stag-beetles or Stag-horns, their branching mandibles being compared to the antlers of a stag. The common Stag-beetle is *Lucanus dama*, and it is also found in decayed tree-stumps of certain trees, as the apple, oak, and others.

half and more. At first this stem is sheathed in the two leaves; but the latter soon open and grow far above the part containing the flower. Each leaf is divided into three ovate, pointed leaflets, and are of a dull green color. In some specimens these leaves grow to be of enormous size and length. Where the leaf-stems part company they are sheathed, and from between the sheaths springs the stem of the floral part (Figs. 3 and 4). This latter consists of a hood or spathe, within which we find a soft, club-like wand or spadix. The spathe varies in its coloration, being

THE LOCUSTS

IDENTIFICATION AND CHARACTERISTICS

BY SAMUEL B. DETWILER

BY a curious power of alchemy, the locusts transform the nitrogen of the air into a fertilizer that greatly enriches the soil in which they grow. This transformation is brought about by bacteria that live on the rootlets and extract nitrogen from the air through complicated chemical processes. Many other members of the Pulse family, which contains over seven thousand distinct species of plants throughout the world and about fourteen hundred in North America, have the same property. The plants in this great group range from small herbs to great trees, and some of them, such as peas, beans, clover and alfalfa furnish highly valuable food for human beings and animals. Others supply important vegetable dyes, including logwood and indigo. Senna and other medicines are also obtained from members of this group.

All of these plants are called legumes or pod-bearers because their fruits are pods on the order of those borne by the common cultivated varieties of beans and peas. The acacias are well-known pod-bearers, closely related to the locusts. A species of acacia furnished the Shittim wood, or "incorruptible wood," mentioned in the Bible as the material used in constructing the Ark of the Covenant and the Altar of the Tabernacle. It also provided the thorns for the

crown of Christ. The Buddhists and the Hindus regard the wood of the acacia as sacred, and burn it on their altars. Chinese doctors place acacia seeds in a vessel and cover them with ox-gall. After these seeds have been dried in the shade for three months, they are prescribed to clear the eyesight, keep the hair from turning gray and to cure hemorrhage. The ancient herbalists are con-

sidered to have given us the foundations of modern botanical science. These learned men carefully observed the marks or signs on various portions of the plant structures, and claimed they could thus determine the medicinal virtues of plants. The acacia was known to them as a plant identified with the eyes and was assigned for use in various eye troubles.

The black locust (*Robinia pseudacacia*), better known in Europe as the false acacia because of its resemblance to the true acacias, is a native of North America. It originally grew in the Appalachian Mountains from Pennsylvania to Georgia, and in eastern Oklahoma and Arkansas. It has been planted throughout the United States, except the extreme southern portion, and in many places it has escaped from cultivation. It is named Robinia in honor of Jean Robin, Director of the Garden of the Louvre, who introduced it into



THE BLACK LOCUST

The characters which identify black locust in summer and winter: (1-2) twigs bearing leaves, flowers, fruit pods and seeds, and (3) a twig as it appears in winter, armed with stout prickles. Sections of winter twigs (4 and 5) enlarged, showing several buds in the protected cavity between the spines.

France about the year 1600. The black locust was one of the first American trees to be planted in Europe, and at once became fashionable for its beautiful flowers and foliage. Later, its culture was neglected until near the close of the eighteenth century, when its value as a timber crop and soil improver was recognized. In 1786, de Crève-Cœur presented a paper before the Agricultural Society of Paris, eulogizing the black locust and giving facts about its culture and uses in the United States. According to this writer, the colonists learned very early of the value of this tree and Massachusetts offered prizes for the best plantations. He mentions a farmer of Long Island who planted 14 acres of pasture land to black locusts and gave the plantation no care except to keep out cattle. Twenty-two years later he sold some of the wood to a ship's carpenter for £260 8s. 4d., and three years later he obtained a similar sum from the sale of additional timber from the planting. De Crève-Cœur continues:

"The Americans think so highly of this tree that I have heard many colonists express sentiments to the following effect: 'May Heaven grant that when I die, I may be able to leave to my children 50 acres of land planted with acacias, and well enclosed! My house may be destroyed by fire, my harvest may fail, the contracts I hold be violated by cross events and bankruptcies—whatever else I may have may perish—but if I live long enough to accomplish this great object of my wishes, I shall have no reason to dread death. My family will be secure and will find in this



BARK OF BLACK LOCUST

The bark on trunks of black locust trees of all ages is thick and rough, varying in color from reddish brown to dark gray, and separated into heavy, rounding ridges.



EASILY DISTINGUISHED BY ITS FRUIT

The fruits of the black locust are long, brown pods, two to four inches long. They split open easily, revealing four to eight flattened, smooth brown seeds. The seeds ripen in the autumn but many of the pods hang on the trees until the following spring.

treasure all the resources that they may require in order to enjoy a sufficient competence."

It was decreed during the French Revolution that May sixth of each year should be consecrated to the black locust, and the following description appeared in the Cultivator's Year Book, for use in the schools:

"Acacia (false), a large spiny tree, a native of North America. It grows rapidly; its foliage is very graceful and casts a light shade; its flowers are white and very odoriferous; and a useful syrup is made from them; the young shoots are good for cattle; the root is tender and saccharine, having the scent and flavor of stick liquorice; the wood is veined and hard, it splits readily and does not decay when exposed to the action of either air or water. It is used for hop poles, vine props, mill work and other machinery. In America it is preferred for the stern posts and knees of vessels."

The black locust is a medium-sized tree, seldom attaining its maximum size of 80 or 90 feet in height and 3 or 3½ feet in diameter. Average mature trees are 50 to 60 feet high and 18 or 20 inches in diameter. Trees growing in the forest have straight, slender trunks, clear of side branches for most of their length and forming a narrow, oval top. In the open, black locust usually branches low or divides into several stems; the top does not spread widely, and is open, rounded and irregular. The bark on trunks of trees of all ages is thick and rough, varying in color from reddish brown to dark gray, and separated into heavy rounding ridges that are free

from surface scales. The leaves are 8 to 14 inches long, and consist of smooth-margined oval leaflets, each about one-half inch in length, arranged in pairs on the sides of the leaf stems with a single leaflet at the tip. At night the leaves droop to prevent excessive evaporation of moisture from the leaf-surface. A little lad who had noted this habit, once objected to going to bed early because the locust leaves "had not yet said their prayers."

Two little spines at the base of the locust leaf-stalk take the place of leaf-like appendages found at this point on many other kinds of trees. These prickles are stout and sharp, like those on the stems of rose bushes, and help to protect the tender leaves from browsing animals. A hairy cavity between these spines contains 3 or 4 tiny buds so small that they may easily pass unnoticed during the winter, but they enlarge in the spring and become plainly visible. Only one bud at a time develops into a shoot; if this shoot is killed, another bud starts to grow. Thus Nature enables the locust trees to replace twigs and branches which are frequently lost through damage by cattle, wind or insects, and this fact accounts, in part, for the scraggly appearance of many old trees.

The glory of the black locust is in May or June, when masses of creamy white blossoms transform even the most unsightly tree into a bower of beauty and perfume. The flowers resemble those of the garden pea in size and shape, and are borne in drooping clusters, 4 or 5 inches long. Usually, they appear after the leaves, and the bright green foliage furnishes a rich setting for the exquisite blossoms. By the end of summer, each flower has matured into a thin, dark brown pod, 2 to 4 inches long, half an inch wide, enclosing 4 to 8 flattened, smooth, brown seeds. These seeds may be sown in the fall, but a better plan is to store them in a cool, dry place over winter, and sow them in the spring, after danger of frost is past. Unless water heated nearly to the boiling point (from 160° to 180° F.) is poured over them at this time, and the seeds then allowed to soak for some hours until they

swell, many of the seeds are apt to lie dormant until the following year. Treated in this manner and immediately sowed in rich, fresh soil, the seeds germinate well and the young trees are frequently from two feet to six feet high at the end of the first season's growth.



THE BEAUTIFUL BLOSSOMS OF BLACK LOCUST

The glory of the black locust is in May or June, when masses of creamy, white blossoms transform even the most unsightly tree into a bower of beauty and perfume. The flowers generally appear after the leaves, and the bright green foliage furnishes a rich setting for the exquisite blossoms.

No other broad-leaf tree, except the chestnut, compares with the black locust in its ability to send up vigorous and abundant sprouts. These sprouts spring principally from the roots when a tree is cut down, and they are also produced whenever the roots of standing trees are cut or injured. At one time it was customary to plant rows of black locust trees about 50 feet apart, and the following year plow furrows three feet from the rows. Locust sprouts would spring up along the edges of the furrows, and by repeating this process each year it is claimed that a thrifty plantation was secured at little cost. The sprouts are sometimes so numerous and form such dense thickets, that the trees cannot make a good growth. It is difficult to destroy a black locust plantation even though

the trees are uprooted, since small roots that break off send up abundant sprouts.

Black locust develops rapidly when young, growing 2 to 4 feet in height and one-fourth to one-half inch in diameter yearly, but its rate of growth begins to slacken when it is 15 or 20 years old. It thrives on moist fertile soils, such as river bottoms and coves or ravines in the mountains, and it appears to have especial health and vigor on soils well supplied with lime. It will also do well on poor soils, such as sandy land or rocky slopes—in fact, almost any soil except a wet, heavy, sour soil is adapted to it.

Foresters in Hungary have said that "the locust has been discovered in America especially for the Hungarian plain." Dr. Gifford states that in Europe the black locust is free from its greatest enemy in America—the locust borer. This insect riddles the trunks and branches of black locusts; if it does not kill them outright, it retards their growth and causes them to break and become worthless. Individual trees may be protected from this insect by soap emulsions or lime washes, applied to the

trunk and branches before the time the mature beetles lay their eggs in August. The beetles feed on golden rod, and may be collected and destroyed. The expense of special treatment to control the borers is prohibitive in the case of plantations. Therefore, unless careful observation indicates that the black locust will not be seriously



GROWTH FROM SEED PLANTING

Black Locust Grove in Southern Indiana, only nine years old, from seed. Poor soil in an old pasture was ploughed up and seeded to locust nine years before this photograph was taken. Cultivation was given the first year, after which it was neglected and the cattle permitted to enter the plantation. The grove was thinned twice. An estimate of the timber, as shown in the photograph, established the fact that there were 394 trees per acre, estimated to yield 1,028 fence posts, worth 20 cents each on the ground—a value of more than \$20 per acre per year.

injured by its most destructive pest, it should not be set out in plantations. In certain localities the borers have not yet become numerous enough to harm the locust trees to any great extent; this is true especially of Oklahoma and the states west of the Rocky Mountains.

Another insect, a leaf miner, has caused much damage to locusts in portions of the eastern United States. This insect causes the leaves to turn brown, as though scorched by fire. Young trees seem to suffer most, and are weakened so that they easily die from other causes. The remedy is an arsenical spray, but this is practical only in the case of shade trees. A fungus known as the yellow-rot is very destructive to the heartwood of living trees, and is the cause of the hollow trunks of so many old black locusts. Another heart-rot, the sulphur polypore, is a very destructive disease that sometimes attacks this tree. The fruiting bodies of these fungi are shelf-like growths that push their way through the bark.

The wood of black locust is very hard, stiff, strong and durable. Its extreme hardness is due to minute crystals, which soon dull the edges of cutting tools. It is coarse grained and splits readily. The heart wood is yellowish brown and for this reason the tree is frequently called yellow locust. Sometimes the wood has a dark reddish brown or greenish tinge. The sapwood is yellowish white, and forms a very narrow band around the heart wood; it does not resist decay like the latter. The principal uses of the wood are for fence posts and rails, insulator pins for telephone and telegraph cross arms, tree nails and the hubs of carriage wheels. Under average conditions, locust posts will last 20 to 35 years, and accordingly, they have

a high market value. The wood makes excellent fuel, and is also valuable for railroad ties and the ribs of vessels. It does not enter largely into manufactured lumber because the supply is limited, and is used for the special purposes to which it is best adapted. The bark of the roots is poisonous when eaten in large quantities, but in small doses it is used as a tonic in homeopathic medicines. Black locust leaves furnish a principle similar to that from which indigo is obtained, but it is not known to be of commercial use.

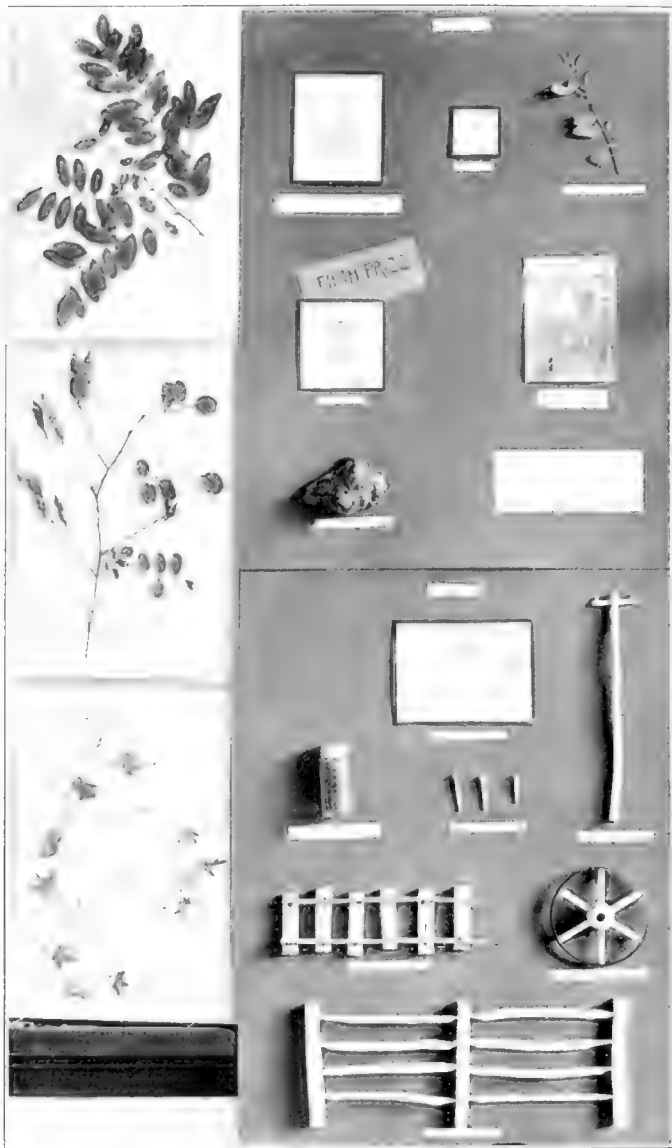
A spineless variety of black locust has a darker colored foliage than the common form. The clammy locust



WITH OR WITHOUT THORNS

Honey locust branches low and forms a spreading, rounded top when growing in the open. The lower branches extend at nearly right angles to the trunk, and the beauty of the tree is emphasized by the light and graceful foliage. The trunk and older branches usually have strong thorns, but a variety free from thorns is available for planting where thorns are objectionable.

(*Robinia viscosa*) is a small tree or shrub of the North Carolina mountains. It is so named because the twigs and leaf stems are coated with a sticky substance. Its flowers are pale rose color, larger and blooming later than those of black locust. The bristly locust or rose acacia (*Robinia hispida*) is another shrub or small tree that grows wild in the Southern Allegheny mountains. It is very prickly, and has large and very beautiful rose-colored blossoms that appear in June or July. It is much planted for ornament, and does well on sandy soils and near the sea shore, but may become objectionable because of its abundant root suckers. The New Mexican locust (*Robinia nco-mexicana*) is found in the semi-arid portions of southern Utah, Colorado, Arizona and New Mexico. It is more of a shrub than a tree, but produces handsome



HOW CHILDREN STUDY TREES

Black locust exhibit, illustrating the life history and commercial uses of this tree. The exhibit won a prize in a tree contest in a Washington, D. C., Normal School.

flowers and is valuable for conserving rainfall on the dry slopes on which it grows.

Honey locust is a title sometimes given to the black locust in New England because of its fragrant, honey-laden bloom. The true honey locust (*Gleditsia tricanthos*) differs in so many respects from the Robinias or true locusts that botanists give it a separate classification, but the leaves, fruit and wood show that they are closely related. The honey locust may have a single leaf-stem, 7 to 9 inches long, furnished with 9 to 14 pairs of leaflets, or the leaf-stem may divide into 8 to 14 branches and each branch bear 9 or 10 pairs of smaller leaflets. Honey locust leaflets are in pairs the entire length of the stem, while black locust has a single leaflet at the tip of the stem bearing the paired leaflets. Black locust has oval leaflets with even margins; honey locusts are oblong and the margins are slightly wavy or notched. Black locust has short, stout spines that are merely attached to the bark, like prickles of rose bushes,

and drop off or are easily broken off. Honey locust has long branching thorns that are part of the wood of the tree and cannot be easily detached except by cutting. The fruit of the black locust is a straight, dull brown pod, 2 to 4 inches long; the pod of honey locusts is 6 to 18 inches long, bright brown or purplish in color and always more or less curved and twisted. The pods of black locust split open easily; those of honey locust must be torn apart. The differences between these trees enable one to readily distinguish them at all times of the year.

Honey locust is native from Ontario to Florida, west to Kansas and Texas. Ordinary trees are 50 to 75 feet high and 18 inches to 2 feet in diameter, but in the rich bottom lands of the Ohio valley honey locusts have been known to grow to a height of 140 feet and a diameter of 6 feet. In the forest, it usually does not have a trunk quite as straight and clean as black locust. In the open it branches low and forms a spreading, rounded top. The lower branches extend at nearly right angles to the trunk, and the twigs droop with considerable grace. The bark of the trunk is very dark colored and may be rather smooth, but on large trees is commonly cleft into very broad, thick ridges. The twigs have a zigzag growth, and are covered with shining brown or greenish-red bark. The older twigs frequently have strong, shining brown thorns, and the trunk is usually equipped with still larger weapons of defense. These thorns are specially developed branches. The fact that most of the thorns are branched near the base to form a cross, has caused the tree to be called the three-thorned acacia and the Acacia of the Passion.

Four of five buds are found at each leaf scar, but only the upper one of these buds can be seen, and that is exceedingly small. The flowers appear late in the spring, in small greenish clusters. They are fragrant and honey laden but not showy, nor are they pea-shaped, like those of the



LOCUST AS A SHADE TREE

Honey locust planted as a street tree in Kansas. The honey locust is free from the serious insect and fungous enemies that beset the black locust, and is in every way an admirable tree for shade and ornamental planting. It is one of the hardiest trees for planting in the naturally treeless area of the United States.

black locust. Each cluster is composed entirely of either pollen-bearing or pod-forming flowers. Sometimes both kinds of clusters are found on the same tree; at other times they are on separate trees. The long twisted pods ripen their seeds early in the autumn, and drop from the trees, a few at a time, throughout the winter. The pods contain a sweet pulp, from which the names honey locust and honey shucks originated. They enclose 10 to 15 flat, oval seeds. These may be sown in the fall or kept in moist sand over winter and treated like black locust seeds.

The heartwood is colored bright reddish brown, and is surrounded by a thin band of light colored sapwood. When quarter-sawed, the wood has a beautiful figure. In other qualities it resembles the wood of black locusts, and is used for similar purposes. The seeds sometimes have a local market at country flour mills, where they are used to cleanse the bolting cloth screens.

Honey locust naturally selects the rich soil of moist river bottoms, but will do well on any soil except where it is exceedingly wet. Its annual rate of growth is 1 to 2 feet in height and one-third to one-half inch in diameter. It is very hardy and free from serious insects and fungous enemies. It is a most useful tree not only for planting for shelter belts and hedges in the prairie regions, but as a shade and ornamental tree in a large portion of the United States. If the thorns are objectionable, the thornless variety can be obtained.

Another species, the water locust (*Gleditsia aquatica*) is a small tree found infrequently from South Carolina to Texas, and northward in the Mississippi Valley to Illinois. A third and very rare species of honey locust is found in Texas.

The writer is indebted to the United States Forestry Service for some of the photographs and material in this article.

TREES

What is the wisdom taught of the trees?
Something of energy, something of ease;
Steadfastness rooted in passionless peace.

Life-giving verdure to upland and glen;
Graces—compelling the praises of men;
Freedom that bends to the eagle and wren.

Largess—expanding in ripeness and size;
Shadow that shelters the foolish and wise;
Patience that bows 'neath all winds of the skies.

Uprightness—standing for truth like a tower;
Dignity—symbol of honor and power;
Beauty that blooms in the ultimate flower!

By STEPHEN HENRY THAYER
In *Pulp and Paper Magazine*

THERE were cut from the National Forests in the fiscal year 1916, 604,920,000 board feet of timber. Of this amount 119,483,000 board feet was cut under free use privilege by 42,055 individuals. In all, 10,840 sales of timber were made, of which 97 per cent were under \$100 in value, indicating the extent to which the homesteader, rancher, miner, small millman, and others in need of a limited quantity of timber draw upon the Forests.

A REMARKABLE WHITE ASH

By Herbert W. Cornell

THE curiously shaped tree shown in the accompanying photograph was discovered by the writer in the summer of 1916 while studying silviculture in the summer camp of the School of Forestry of the Pennsylvania State College, near Lamar, Pennsylvania. It is a



LOOP IN A TREE

This white ash tree was found near Lamar, Pennsylvania, and is such a curiosity that it was cut down and placed in the collection of the School of Forestry at the Pennsylvania State College.

white ash, about forty feet in height, with a remarkable loop about twelve feet above the ground, the bole at this point being about four inches in diameter. The location of the tree makes it improbable that the deformity could have been brought about by human agency. Most probably the tree was bent over and partially broken when young by another tree falling on it, with the result that a small lateral twig became the main trunk. A careful examination showed some evidence that there had been two breaks, but this was uncertain. The tree was in an apparently thriving condition when found. The trunk was secured by Professor J. A. Ferguson of the Pennsylvania State College and has been removed to the college museum.

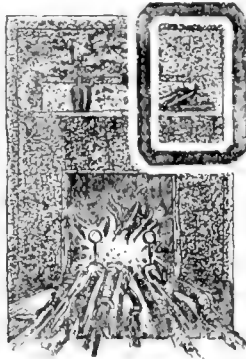
TREES WITH A HISTORY

IS there a tree with a history in your town? What do you know about it? Is it being cared for or is it being allowed to die? AMERICAN FORESTRY would like to know about such trees and would be glad to receive pictures and articles not to exceed 100 words about such trees. Such as are available will be printed in the magazine from time to time.

FORESTRY FOR BOYS AND GIRLS

BY BRISTOW ADAMS

"IN THE PLACE WHERE THE TREE FALLETH"



HE meets all sorts of folks who are interested in trees. At one end of the line there is the man who cuts, burns, and wastes the woods with no thought of any one but himself, or of anything but the money he may make, even if he makes it by destroying all hope for any future returns from the same piece of woods. At the other end is the man or woman who cannot bear to see a tree cut for any purpose, and thinks that any use of an ax is wicked.

We think that a middle place is better, and that both of the extreme views are wrong. There is this difference, however: the man who cuts and wastes is sinful; the one who cannot stand the wise harvesting of the wood crop is only foolish. Sometimes this foolishness makes us laugh, sometimes it makes us mad, and sometimes it makes us sad. Then, again, it may cause all three of these feelings.

The children frequently ask me to tell about an old man I once knew, who loved the trees, but not wisely. The youngest thinks the story is funny, and the oldest girl finds it sad; those in between seem to think that it is a curious sort of yarn, and don't know just how to take it. I wonder how it will seem to you!

THIS old man used to write to me about the trees, and finally he asked whether I would come and talk about them before some of the schools near where he lived. He said he would arrange for all the meetings, and that all I would have to do would be to bring along some lantern slides and my voice, and they could do the rest.

My own children will not let me leave out any part of the trip or of what hap-

pened; if I try to skip, or if I forget even the smallest thing they "call me down" and make me put it all in—about the boy who met me at the station and drove me out to the man's house in a rickety old rig like the wonderful one-hoss shay, the horse being very small and very thin, and all shaggy with long matted hair, which looked as if it had been whitewashed in spots.

"Mr. Emanon sent me," said the boy, "because he was sick and could not come." (Emanon is just no name, spelled backward, because I would not hurt the feelings of this old man for all the world.)

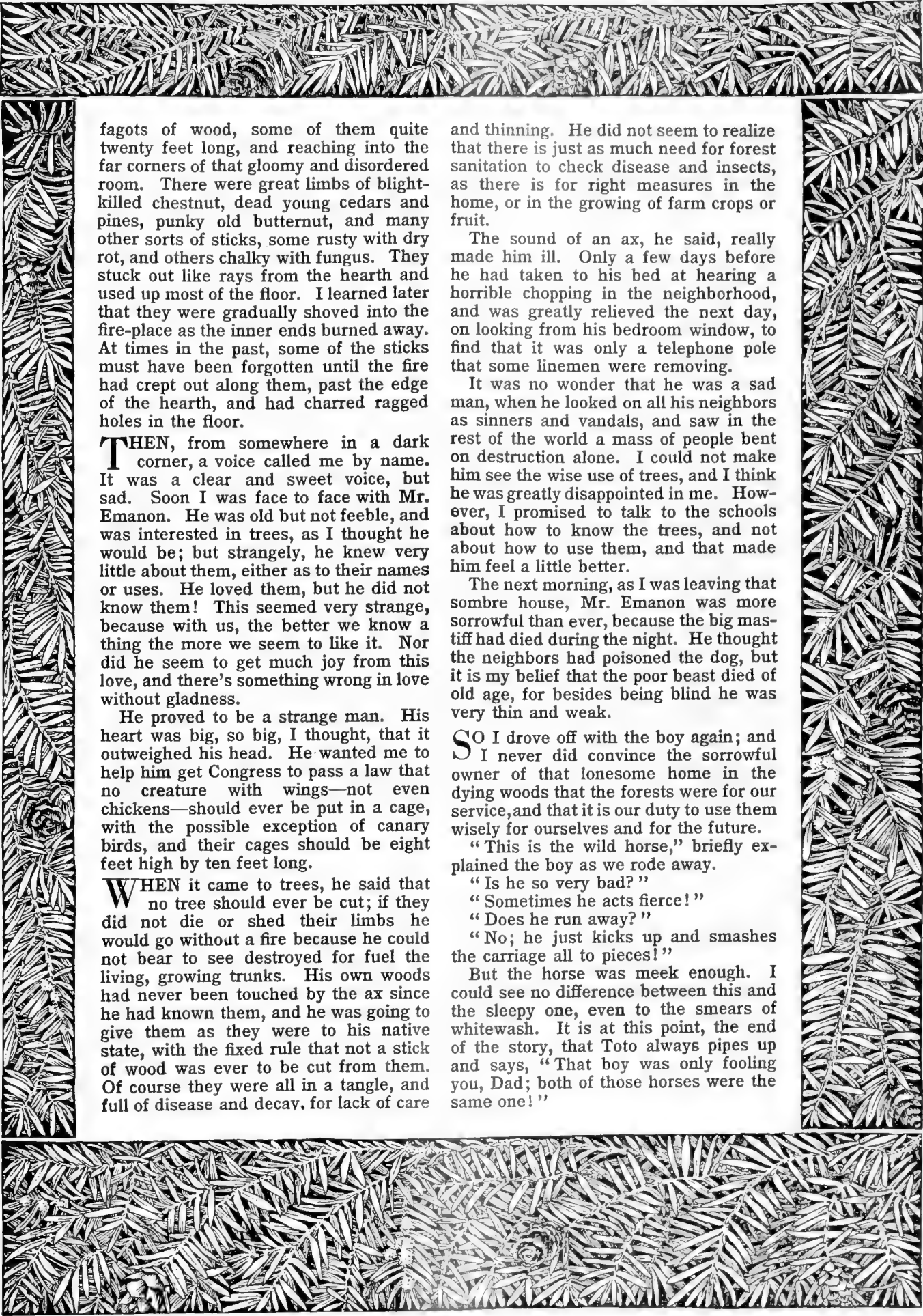
"But I should not go if he is sick; it will make a great deal of trouble for him."

"That don't make no difference," replied the boy. "He always gets sick-like when he's excited about folks coming."

So I climbed into the old shay that was wired together and reinforced in places with umbrella-ribs, and we set off behind the little horse that had all its feathers rubbed the wrong way. The boy said "they had another horse but it was dangerous to drive"; this one, he said, had only one bad habit—"it would lie down and go to sleep jest anywheres!" But it stayed awake and on its feet until we got to the house—a little dark house in a little dark woods.

THERE was a dim light in one of the lower rooms and the boy told me to go in while he put the horse up. I found myself in a dim-lighted hall; there were stuffed birds, old books, pictures, and dead flowers in vases and dying ones in pots. These things I could see from the flames of an open fire in the next room, where there were four dogs—an old blind mastiff, a young setter, a white bull-terrier, and a shaggy Airedale that growled from beneath the piano but did not offer to come out.

Stretched fan-wise out over the floor, with their ends in the fire, were huge



fagots of wood, some of them quite twenty feet long, and reaching into the far corners of that gloomy and disordered room. There were great limbs of blight-killed chestnut, dead young cedars and pines, punky old butternut, and many other sorts of sticks, some rusty with dry rot, and others chalky with fungus. They stuck out like rays from the hearth and used up most of the floor. I learned later that they were gradually shoved into the fire-place as the inner ends burned away. At times in the past, some of the sticks must have been forgotten until the fire had crept out along them, past the edge of the hearth, and had charred ragged holes in the floor.

THEN, from somewhere in a dark corner, a voice called me by name. It was a clear and sweet voice, but sad. Soon I was face to face with Mr. Emanon. He was old but not feeble, and was interested in trees, as I thought he would be; but strangely, he knew very little about them, either as to their names or uses. He loved them, but he did not know them! This seemed very strange, because with us, the better we know a thing the more we seem to like it. Nor did he seem to get much joy from this love, and there's something wrong in love without gladness.

He proved to be a strange man. His heart was big, so big, I thought, that it outweighed his head. He wanted me to help him get Congress to pass a law that no creature with wings—not even chickens—should ever be put in a cage, with the possible exception of canary birds, and their cages should be eight feet high by ten feet long.

WHEN it came to trees, he said that no tree should ever be cut; if they did not die or shed their limbs he would go without a fire because he could not bear to see destroyed for fuel the living, growing trunks. His own woods had never been touched by the ax since he had known them, and he was going to give them as they were to his native state, with the fixed rule that not a stick of wood was ever to be cut from them. Of course they were all in a tangle, and full of disease and decay, for lack of care

and thinning. He did not seem to realize that there is just as much need for forest sanitation to check disease and insects, as there is for right measures in the home, or in the growing of farm crops or fruit.

The sound of an ax, he said, really made him ill. Only a few days before he had taken to his bed at hearing a horrible chopping in the neighborhood, and was greatly relieved the next day, on looking from his bedroom window, to find that it was only a telephone pole that some linemen were removing.

It was no wonder that he was a sad man, when he looked on all his neighbors as sinners and vandals, and saw in the rest of the world a mass of people bent on destruction alone. I could not make him see the wise use of trees, and I think he was greatly disappointed in me. However, I promised to talk to the schools about how to know the trees, and not about how to use them, and that made him feel a little better.

The next morning, as I was leaving that sombre house, Mr. Emanon was more sorrowful than ever, because the big mastiff had died during the night. He thought the neighbors had poisoned the dog, but it is my belief that the poor beast died of old age, for besides being blind he was very thin and weak.

SO I drove off with the boy again; and I never did convince the sorrowful owner of that lonesome home in the dying woods that the forests were for our service, and that it is our duty to use them wisely for ourselves and for the future.

"This is the wild horse," briefly explained the boy as we rode away.

"Is he so very bad?"

"Sometimes he acts fierce!"

"Does he run away?"

"No; he just kicks up and smashes the carriage all to pieces!"

But the horse was meek enough. I could see no difference between this and the sleepy one, even to the smears of whitewash. It is at this point, the end of the story, that Toto always pipes up and says, "That boy was only fooling you, Dad; both of those horses were the same one!"



Photograph by Fred A. Shutz

PLANTING MEMORIAL OAK AT

BY MRS. LYDIA ADAMS-WILLIAMS, STATE CHAIRMAN OF CONSERVATION

TO perpetuate patriotism, and as a mark of veneration for the Father of his country, the Forestry sub-department of the Conservation department of the District of Columbia Federation of Women's Clubs, recently planted a red oak sapling near the tomb of George Washington at Mount Vernon. The ceremonies were in charge of Mrs. Addie W. Foster, chairman of forestry, who was assisted by Dr. Margaret Huddleson, vice-chairman, to whose efforts the success of many of the preliminary arrangements is due.

Harrison Dodge, superintendent of the Mount Vernon estate, in a congratulatory address, received the tree on behalf of the board of regents. Representatives of the following-named clubs, societies and organizations were present, and each representative threw in a shovelful of

earth: the District of Columbia Federation of Women's Clubs, the Daughters of the American Revolution, Legion of Loyal Women, Women's Relief Corps, Ladies of the Grand Army of the Republic, New England Society, Sons of the American Revolution, League of American Pen-Women, Woman's National Press Association, Order of Rebeccas, P. E. O., National Woman Suffrage Association, American Forestry Association, Grand Army of the Republic, Abacadabra, General Federation of Women's Clubs, Excelsior Literary Clubs, Capitol Hill History Club, Columbia Heights Art Club, Philo-Classics and several others.

"The oak tree is truly representative of Washington," said Mrs. Wm. E. Andrews, past president of the federation; "he was as strong as an oak and was never worried

A PIONEER PINE PLANTER

S. T. KELSEY, thirty-third degree forester and one of the pioneer white pine planters of the country, was at the annual meeting of the American Forestry Association in Washington. He has attended a lot of these meetings and has been talking white pine since 1856 when he brought down thousands of the seedlings from Canada and planted them in Illinois.

Kelsey, whose home is now in Baltimore, went to Kansas in 1865 and there talked of the virtues of white pine but they were having some exciting times in those days in Kansas and Kelsey had a hard time getting people interested in either white pine or forestry. At last, however, the Atchison, Topcka and Santa Fé Railroad decided

that a few trees here and there would make things look more like home to the settlers and the road put Kelsey to work. He, therefore, became the first forester employed by a railroad. He planted trees all along the Santa Fé for four years but as Kelsey says; "the people did not take much interest when corn was eight cents a bushel and they got more out of it by using it for fuel than sending it to market."

Kelsey tried for years to organize a forestry association but could not get more than a score of men interested at any one time. Now however things have changed and Kelsey rarely misses an annual meeting and at every one of them he is warmly congratulated.



MOUNT VERNON ON THE POTOMAC

FOR THE DISTRICT OF COLUMBIA FEDERATION OF WOMEN'S CLUBS

by the winds of adversity and sarcasm that blew about him." The ceremony was declared by Mrs. Mary S. Lockwood, chaplain of the Daughters of the American Revolution, to be a sign that the women of the country still revere the memory of Washington and believe in his ideals. Mrs. Carrie E. Kent, another past president, presented the birdhouse for the tree and accompanied the gift with an original poem, in which she urged all to look upward and extolled the oak as the emblem of beauty, strength and power, and all-embracing love.

Mrs. Charlotte Emerson Main, past president, stated that the District of Columbia Federation of Women's Clubs, under her régime, was the first woman's organization to take up Conservation, the work being started by Mrs. Lydia Adams-Williams. Mrs. Main declared that the

oak was typical of the great strength of Washington, making him a "monarch among men." Others who took part in the program were Mrs. Anson Rogers Tracy, who presented the tree; Mrs. Augustus Knight, director to the General Federation, who prophesied that the oak would become great and beautiful with an enduring influence for patriotism and loyalty; Mrs. Jason Waterman, who read an extract from Henry Ward Beecher; Dr. Margaret Huddleson and Dr. Ella Marble Tanberg, each of whom made addresses. Mrs. Harry Cunningham led in singing patriotic music; an original poem by Mrs. Jessie L. Engle was read by Mrs. Main; and the exercises were closed by Mrs. Court F. Wood, president of the federation, who delivered an address on the tree as a memorial to Washington.

CHARADES FOR CHILDREN

Here Are Some More Puzzlers for the Children. Who Can Answer Them? Those Who Cannot May Read the Answers in March American Forestry

NUMBER 3

My first is the name some give to a dog
While my second you'll find at home 'neath
a log
Put these two together and then you will find
A fruit that makes jell of the very best kind.

Answer next month.

NUMBER 4

My first is a name Lincoln gave to his son
My second boys jump with after a run
Put these two together and lo and behold!
You'll find him in pools where it's dark and
cold.

Answers to last month: 1—Walnut 2—Sparrow.

THE WAXWINGS FAMILY

(Family Bombycillidae)

BY A. A. ALLEN, PH.D.

THE family of waxwings is one of the smallest families of birds, containing but three species. In spite of this, however, the family has a wide distribution throughout the northern hemisphere, one species, the Bohemian waxwing, being found in North America, Europe, and Asia.

Waxwings are easily distinguished from other birds by their sleek, almost silky brownish plumage and their crested heads. They get the name of waxwing from the

sects. With the ripening of the June berry and the choke cherry, however, the waxwing varies its diet with a considerable quantity of fruit, so that often about the sweet cherry trees, particularly where native fruit or mulberries are scarce—together with the robin, the oriole, and the woodpecker—he becomes a veritable pest. He continues his diet of fruit through the winter until insects appear again in the spring, wandering from the wild grapes to the mountain ash, Boston ivy, and Virginia creeper berries, and finally descending to the barberries in the spring when all other fruit is consumed. They travel in compact flocks until the nesting period, flying with a direct, even flight that can be recognized at a distance. Sometimes these flocks number hundreds of individuals but usually less than a dozen. It is interesting to watch them feeding, for they have gained for themselves the reputation of being the only birds or wild animals in which the rudiments



THE NEST AND EGGS OF THE CEDAR WAXWING

This home is in a sweet gum tree. The waxwing waits until midsummer before beginning to nest and lays grayish blue eggs that are doubly spotted.

appearance of the inner feathers of the wing which seem to be tipped with little drops of red sealing wax. Across the tip of the tail in the Bohemian and Cedar waxwings is a band of yellow, but in the Japanese waxwing of eastern Asia the band is rosy red.

The Bohemian waxwing in this country is confined in summer to the Northwest from Alaska to British Columbia, wandering erratically southward to the northern United States in winter, occasionally appearing as far east as New York and New England. It is a much larger and grayer species than the common Cedar waxwing, having white bars in its wings and with the under tail coverts reddish instead of white.

The Cedar waxwing, which is a fairly common bird throughout the United States and Canada, is better known in most places by the name of cherry bird because of its fondness for fruit. Until the fruit ripens in the late summer the waxwings feed largely upon canker-worms, elm-leaf beetles, and other pests of orchard and shade trees, becoming expert fly catchers in the pursuit of flying in-



PATIENCE REWARDED

The cedar waxwing is called the "cherry bird" because of its fondness for fruit. It more than repays for the damage which it does about sweet cherry trees by the large number of insects which it destroys.

of etiquette are developed. It is not an uncommon sight to see a small flock arrange themselves on a branch where only the one at the end can reach the fruit. He plucks it and very politely passes it to his neighbor and thus on down the line until the last bird is reached and he swallows it. This may continue for some time before they scatter and commence feeding by themselves. The origin or meaning of this habit has not yet been ascertained but it certainly seems quite in keeping with their quiet, reserved ways, their dignified bearing and polished appearance.

For some other unknown reason their nesting season is greatly delayed and although they are with us throughout the year, they wait until all other birds except the goldfinches have reared their broods before commencing to build. Some nests are started as late as September but the majority are begun about the middle of July and some as early as the middle of June. The nest is a rather bulky structure placed in a fruit or shade tree or often in a thorn bush from five to twenty feet from the ground, and the



THE CEDAR BIRD RETURNS WITH A FULL MARKET BASKET
Instead of carrying the food in its beak like most birds, the waxwing fills its crop and later regurgitates it. Here the bird's throat is seen distended by the cherries which it has brought back to its young.

bluish gray eggs are doubly spotted, some of the spots seeming to be put on beneath the surface of the shell.

Waxwings are faithful parents, one bird usually standing on guard on some conspicuous tree top near the nest while the other incubates or broods the young.

The food is brought to the young in the crops of the parent birds, their necks often appearing quite distorted when a half dozen or more cherries are brought back at once. The accompanying picture of the bird at the nest shows the bird's neck thus distended. In the other photograph of the single young, the old bird has just thrown back its head and coughed up a cherry which it is about to present to its hungry offspring.

The best protection against the depredations of the waxwings and other fruit-loving birds is the planting of plenty of native fruit about the orchard to supply the food which they need, and an occasional frightening. Strips of paper or bright bits of glass or tin hung in the trees are sometimes efficacious, although it is usually necessary to frighten the birds occasionally by banging a tin pan or firing a blank cartridge. It is a shortsighted policy to shoot them for they more than repay the farmer for the cherries by the insects which they destroy at other times of the year.

A ONE-TREE PUBLIC PARK

By Allen H. Wright

BECAUSE a noble oak tree had stood for many years on a highway leading out of the city of Visalia, California, the authorities, when it came time recently to improve this thoroughfare as a city street, decided to permit the tree to remain where it was, in all its glory.

To do this in a legal manner an ordinance was adopted setting aside a plat of ground about the base of



THE COUNTRY'S SMALLEST PARK

This is located in Visalia, California, and was created in order to preserve a noble oak tree on a highway leading out of the city.

the tree, ten feet square, and dedicating it as Askin Park, in honor of the mayor of the city, and the wife of the latter was made the official custodian of the park, situated at the intersection of Main Street and Giddings Avenue.

Now the city of Visalia, in addition to its many other interesting features, claims to have the smallest park, dedicated for public use, in the United States, if not in the world. It can lay claim, in all probability, to having the only one-tree park in the country, also. Visitors to Visalia often take the drive out Main Street in order to be able to say they have viewed this diminutive park.

AN immense pecan tree on the farm of W. A. Tonini, a few miles east of Evansville, Indiana, was felled recently. The tree was six feet in diameter and, according to the rings, was 400 years old. The tree was visited by the officers of the National Nut Growers' Association and was declared the largest pecan tree in the United States.

HOW FAR TO GO IN CAVITY FILLING

BY J. J. LEVISON, M. F., FORESTER FOR THE CITY OF NEW YORK

READERS of AMERICAN FORESTRY often ask us about cavity filling—just how it should be done, and, what is more important, when to do it and when not to do it. We shall now have a heart to heart talk on this question and see if we cannot come to a mutual understanding on its limitations and advantages.

Generally speaking, there are two classes of cavities: those which are shallow and afford no chance for the accumulation of moisture and those which are deep and afford opportunity for the accumulation of moisture.

The treatment of the *shallow* group of cavities is a very simple one. All soft and decayed wood should be chiseled off so that the water falling on the surface of the wound will naturally run off. The exposed wound should then be thoroughly covered with a coat of coal-tar mixed with creosote; nothing else should be done to it for a year or two, when another coat of tar and creosote may be applied.

In case of *deep* cavities where moisture lodges, the treatment is different. With these we must not only eliminate all decayed and diseased wood but we must also fill the cavity or part of it so as to drain water. The absolute elimination of diseased wood and the prevention of any possible accumulation of moisture are the two main considerations in all cavity filling. This involves considerable experience and knowledge of fundamental principles and for this reason if one has not had enough experience himself it may often be preferable to call upon some one of the tree expert companies. Before filling the cavity, the operator should determine whether it is worth doing the work at all or whether it is more practicable to cut the whole tree or branch off. A cavity may be so permeated with disease or so deep or the tree so old and weak that the entire elimination of disease is impossible; also the condition may be such

that the tree or limb may break soon after the filling is put in. In that case it is wiser to sacrifice the tree and not to fill the cavity.

Where, however, a filling can be put in with advantage, the process should consist in removing all diseased wood from it with the free use of the knife, chisel or gouge. It is far better to enlarge the cavity by cutting out every bit of diseased wood than it is to leave a smaller hole in an unhealthy state. Disease left within the cavity will continue its destructive work behind the filling with more vigor than if there had been no filling at all. Where there are boring insects within the cavity, their destruction must be assured before filling is commenced.

When the cavity is absolutely freed from disease and insects, its walls should be washed with corrosive sublimate and covered with white lead or with Bordeaux mixture. The interior should be studded with nails and solidly filled with bricks, stones, and cement or with charcoal, bricks, and

cement. When that is done, the outer edge of the cavity is interlaced with wire to assist in holding the solid material in place, and a layer of cement, mixed with one-third sand, is then placed over the wire. When dry, this layer should be covered with coal-tar. The exposed face of the filling must not be brought out to the same plane with the outer bark of the tree, but should rather recede a little beyond the growing tissue which is situated immediately below the outer bark. By this method the growing tissue will be enabled to extend over the cement and cover the whole cavity, if it be a small one, or else to grow out sufficiently to overlap the filling and hold it as a frame holds a picture. The growth of this living tissue can be much accelerated by cutting around the border of the orifice immediately before the season of growth commences. Of the many failures in filling cavities, the great majority are due to



FILLING A TREE CAVITY

It is essential that every bit of decayed and diseased wood shall be cut or scraped out and also that the cavity is filled so as to drain water, for when this work is improperly done it is wasteful and often injurious.

an incomplete removal of diseased wood, to the cement being flushed out to the surface of the outer bark, or to the want of tar on the outer surface of the filling.

Cavity filling to a limited extent, when properly done, is very useful and conducive of much good. When improperly done or done unnecessarily, it is wasteful and often injurious. Here are a few instances of the unnecessary and improper kind often met with:

One often sees diseased cavities covered with sheets of tin. This allows all decayed wood and fungous growth to remain undisturbed within. Now, no one would think of filling a cavity in a tooth without first removing all decayed matter from the interior of the cavity and then washing it with some antiseptic solution. Still, here were similar operations tolerated on trees with utter disregard for these fundamental principles. The tin coverings did more harm than good, because they merely shut out the sun and wind and added more dampness to the interior, thereby favoring every possible development of disease.

Another instance which came under my observation was an attempt to replace bruised bark with cement. This was repeated on hundreds of trees at a vast cost and with utter failure. The person responsible for this work did not understand the purpose of filling a cavity, for, had he known that the filling should be put there to prevent moisture from lodging within the cavity or to furnish a support for the growing tissue to roll over, he might easily have seen that in this instance there was no chance for moisture to lodge on the perpendicular smooth surface, and that the exposed wood furnished ample support for the growing tissue to roll upon. The application of a little coal-tar to the exposed wood would have been all that was necessary. The cement covering, however, merely favored decay, and when the growing tissue on each side of the wound began to extend, it pushed out the cement.

On still another occasion the owner was investing a large sum in filling cavities in chestnut trees that were at the time badly afflicted with the chestnut disease. The



THE COMPLETED FILLING

Here the tree cavity is properly filled. The interior, cleansed of all foreign substances, is studded with nails and solidly filled with bricks, stones and cement, the outer edge is interlaced with wire to assist in holding the material in place and the outer layer of cement is covered with coal-tar.

operator should have recognized the presence of the disease; he should have known that there is no remedy for it, and that the speedy death of these trees was inevitable. As it happened, the trees soon began to die, and the impracticability of the treatment became evident.

ADVICE FOR FEBRUARY

1. Continue removing and burning trees previously marked during the fall.
2. Clean up the heavy brush in the woodlands and burn the superfluous parts while the snow is on the ground.
3. Work on wounds and cavities, confining yourself to digging out all decayed wood, chiseling out old stubs so as to drain water and covering all exposed wounds with coal-tar in mixture with creosote.
4. Collect and burn cocoons and egg masses of insects.
5. Commence pruning fruit trees. Remove dead and superfluous branches from apple trees and cut the crowns back so as to form low compact heads.
6. Inspect all pear trees for fire blight and cut out all

cankers from main branches and trunks and tar the wounds. Also cut out black knot from plum and cherry.

7. Spray fruit trees for sucking insects and canker. Determine beforehand what you are spraying for by communicating with your local agricultural experiment station or by submitting samples and details to this Department of AMERICAN FORESTRY. Then use chemicals and methods especially prescribed for the particular pest you are spraying for. Choose a mild day for spraying work.

8. Prune and tie up grape vines by the end of this month.

9. Turn over the manure pile or leaf mold compost prepared last fall and see that the liquid manure is not wasted.

QUESTIONS AND ANSWERS

Q. I wish to rig up a wagon for moving large deciduous trees from a caliper of eight to fourteen inches. Can you give me any advice or suggestions concerning the

most successful outfits used in your section, or the names of any parties who manufacture for sale outfits for this work?

H. F. B., Minneapolis, Minnesota.

A. With reference to moving your trees, I beg to say that the best outfits for this purpose may be had from Messrs. Isaac Hicks & Sons, Westbury, Long Island, New York, or from Messrs. Lewis & Valentine, Roslyn, Long Island, New York. Both of these firms operate in the Middle West, or send their apparatus there, and I would suggest your writing them direct.

Q. I am desirous of obtaining about 3000 trees (black or yellow locust) to be used as a wind break for several plots of white pine. Where can they be bought? How long before they mature to fence post size and will they grow in New York State climate and in a dry sandy loam. The New York State Conservation Commission does not handle them.

L. B. G., *Gray, New York.*

A. I am very much interested in your inquiry, and note that you desire about 3000 black or yellow locust to plant as a windbreak to protect white pines. I would not like to recommend this tree for your purpose in your location, as I am afraid it would kill back. The soil condition would be all right, but I am afraid the climate would be too severe. The best thing you could use would be more white pine, or red pine, which would cost you just about as much. We are not, however, recommending the planting of white pine anywhere at present, except under the most rigid inspection, and then never in states where there are areas infected by the white pine blister rust, and this is true of New York. Perhaps you have read or heard something of this, which is a dread disease attacking the white and five-leaved pines of the country and seriously threatens their extinction. My best advice to you would be to write Mr. C. R. Pettis, Superintendent of State Forests, at Albany, put your proposition right up to him, and be guided by his advice. He will tell you what is best to plant under the circumstances and where you can secure it, and you will be perfectly safe in following his suggestions. Let us know if we can help you any further.

Q. There stands in my front lawn a balsam which was planted by me about fifteen years ago, and has, until the last year, been a vigorous, thrifty tree. Last summer I noticed that the needles or leaves of the tree were turning red on the upper half of the tree and that very little new growth appeared, and at present, through the action of the wind, these dead leaves are dropping off. I know of no cause for this unless it be the fact that for quite a time during last winter it was laden with sleet and snow. No abrasions or other injury are apparent anywhere. Can you tell me where the trouble comes from and how to remedy it if I am not already too late? I prize the tree quite highly and would fully appreciate any information which will enable me to re-establish its former healthy condition.

C. F. C., *Hillsboro, Wisconsin.*

A. Replying to your inquiry, it would be hard to tell from just a description what is the trouble with your balsam. I would advise that you spread two or three inches of well-rotted manure around the base of the tree at the present time, and dig the same into the ground in the early spring. Have the manure extend outward as far as the branches of the tree. The tree has probably suffered for water and food. If possible, it may also help to cut off the top of the tree to the extent of a few feet. This will make the tree grow more bushy and compact and decrease the requirement for moisture. A good book for you to have would be Levison's *Studies of Trees*. This sell for \$1.75. The chapter on "Diseases and Requirements of Trees" would be helpful to you.

Q. I transplanted several red oak trees from the woods this fall, some of them about 20 feet high and with long side branches. Will you kindly give me some information in regard to the best way to prune them and at the same time stating whether this should be done now.

I have a young black walnut tree on which the tip end of the main top branch has been split. Is there anything I can do

to enable this main branch to continue growing or shall I be obliged to cut it off, which I suppose would prevent it from growing again. R. M. S., *Cincinnati, Ohio.*

A. I would suggest pruning your transplanted oaks *hard*. Cut in every branch several feet and do it any time. Oak trees can best be moved in spring. Oak trees moved from the forest should have their long tap roots shortened, but it is too late for that now.

As to your young black walnut, try putting grafting wax in split part and tie the affected part with burlap. It may heal next spring. Should you be obliged to cut it off eventually you can bend another twig over and tie it to a stick in order to train it to form a new leader. It will later on become strong and erect enough to form a new leader.

Q. Where can I procure a caliper rule for measuring trees? If you know where one can be purchased I would appreciate your kindness if you would furnish me the name and address.

S. J. C., *Mount Vernon, New York.*

A. A caliper rule can be procured from Keuffel & Esser Company, 127 Fulton St., New York City. Telephone, 80 Beekman.

Q. Can you inform me whether there is any Suffolk County or Long Island Forestry organization in existence, or whether any organization is interesting itself in the forest fire question in this locality, or whether this subject is in your jurisdiction.

E. C. H., *East Hampton, New York.*

A. Replying to your recent inquiry, I beg to say that in Suffolk County, Long Island, Mr. Townsend Cox, Jr., of Setauket, Long Island, has formed a local Forestry association, interesting itself in local tree protection. Also, Mr. Charles M. Higgins, of 271 Ninth Street, Brooklyn, has done about as much as anyone in preventing forest fires on Long Island, and has published a little booklet. The Nassau County Association, with headquarters at Mineola, L. I., is beginning to interest itself in forest fires. I am sending you a special report on State Forest Organization, with special reference to fire protection, which will, I am sure, be of value to you. Mr. J. J. Levison, of Sea Cliff, Long Island, New York, incorporated miles of fire lanes and other systems of forest-fire prevention all over Nassau County on Long Island. There are no other bodies specially interested.

Q. I have a swamp of about an acre, the surface of which is about 12 inches above the water of the nearby lake when the water is at its highest level. The ground is rather soggy, and the soil is very rich. Are there any conifers which will grow under these conditions? I would like to make the place resemble a natural tamarack swamp as nearly as possible, and eventually to grow in it Moccasin flowers, Pitcher-plants, Swamp lilies, etc. To do this I must get shade, and I should like to get a variety of conifer to grow, if possible. Any advice which you may be able to give in reference to varieties, methods of planting, etc., will be very welcome."

A. S. B., *Minneapolis, Minnesota.*

A. You could best use the tamarack and the black or swamp spruce, under the conditions you describe. The latter may not make more than a very small tree, and the tamarack will probably outstrip it, but the combination of colors will be an advantage even though they do not compare in height. Farther north, of course, the black spruce makes a larger tree than the tamarack, and it may be that under your particular conditions they will attain about equal size. There will be no special care required in the planting of these trees, other than that ordinarily exercised in the transplanting of coniferous evergreens. I am sending you under separate cover a bulletin of the Department of Agriculture on tree planting on rural school grounds, which will be helpful to you.

EFFORTS TO SAVE THE BIRDS

BY DR. R. W. SHUFELDT, FELLOW OF THE AMERICAN ORNITHOLOGISTS' UNION

IN the hope of securing an appropriation to provide money for enforcing the provisions of the excellent Migratory Treaty Act with Canada, for which conservationists labored so long, a bill is now before Congress awaiting action. It provides for \$170,000 to be placed at the disposal of the Department of Agriculture, in order that the treaty may be enforced and the migratory birds protected according to its provisions.

The necessity for such protection is readily apparent. In the last forty or fifty years several species of birds have become extinct because they were ruthlessly slaughtered. School children know of the Great Auk and how it was completely wiped out by man on its breeding grounds, being used by countless thousands for fat and fishing bait. Hundreds of our water birds are without protection, doomed to the same fate, to say not a word with respect to a similar number of land birds. I have always held that we are entirely responsible for the disappearance and extermination of the bird-life of this country, and that the same destruction has been, and is now going on in other parts of the world, along precisely the same lines. In very rare instances it ap-

pears to be difficult to trace the extermination of some bird to man's having been the cause of it; this applies especially to the case of the Labrador or Pied Duck. This beautiful bird disappeared utterly toward the latter part of the last century; there were none left in 1880, and none had been

observed for a number of years prior to that date. In 1868 I saw four or five of them on Long Island Sound, and, to the best of my recollection, these were two males and three females. A good skin of a male will now fetch a thousand dollars or more. A number of years ago I saw a fine male, then owned by John Lewis Childs, of Floral Park, Long Island; it was in his private museum, and, if my memory serves me rightly, he took a trip across the Atlantic to purchase it in London, securing

the specimen for \$1000. Subsequently he disposed of it at such a price that he lost nothing by going to Europe to obtain it.

No cause for the disappearance of this handsome duck has apparently been discovered. It was a marine species that never went inland; indeed it was called, among other things, the Shoal Duck, as it had the habit of frequenting the shoals and banks at low water to feed. It was an unsuspecting and

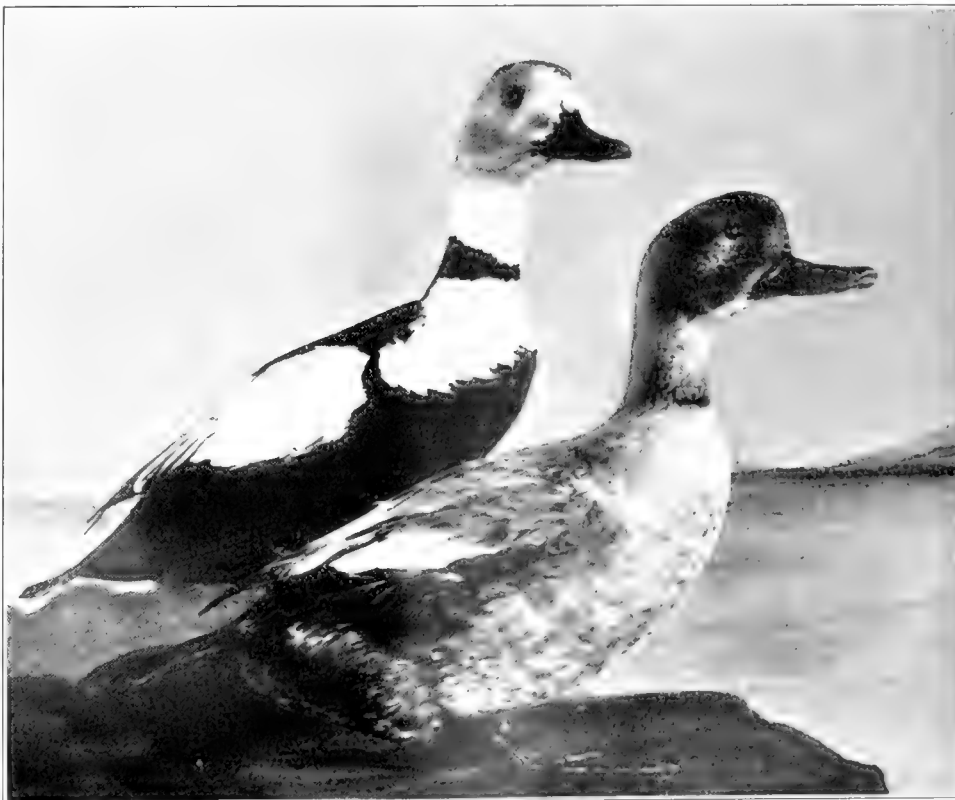
RESOLUTION

Adopted at the International Forestry Conference of the American Forestry Association at Washington, D. C.,
January 18-19, 1917

Resolved

That the American Forestry Association respectfully urges the present Congress to make effective, through the necessary legislative action, the recently ratified Convention between the United States and Great Britain for the protection of the useful migratory birds.

Speedy action is desirable in view of the increasing economic loss to all the people, which must ensue if action be deferred until the next Congress.



THE EXTINCT LABRADOR OR PIED DUCK

There are three mounted specimens of this now extinct bird in the National Museum, two of which are shown in this illustration. The male is the black and white specimen from Long Island presented to the American Museum of Natural History by the late D. G. Elliot, and the female is the speckled specimen presented to the United States National Museum. The female in the picture originally belonged in the collection of Professor Spencer F. Baird, who got it from Audubon, who, in turn, received it from Daniel Webster. It is a Martha's Vineyard specimen, and was used by Audubon in making his plate of this bird.

conspicuous bird, easily seen at a long distance, and was shot in numbers for the markets, and I shall always believe that its extermination was largely due to its being persistently hunted by man.

There are very few examples of this duck in our museums—not more than five in the National Museum, with six or seven in the American Museum of Natural History; none of its eggs are in existence. Only a few of the eggs of the Great Auk have been preserved, and one of these sold, some years ago, in London at an auction, for \$1200.

Within very recent time, a large species of one of our curlews has been exterminated by our gunners, as shown by the late Mr. W. W. Cooke. Many other species of our birds are being rapidly killed off in the same merciless manner, and among these are the several very beautiful quails or partridges of the Pacific coast.

Perhaps the best known of all these instances, however, is the extermination of our Passenger or Wild Pigeon. In the days of Audubon, flocks of these birds numbered a *great many millions*; they were often miles wide, several hundred feet deep, and flew at a high rate of speed for days at a time. A big forest fire in Arkansas once destroyed thousands upon thousands of them—the trees forming their roosts being burned. High winds blew thousands of them into the Atlantic



THE LAST PASSENGER OR WILD PIGEON

This picture of this beautiful bird, which is now entirely extinct, is a reproduction of a photograph, made by the author, of the mounted specimen of the last wild pigeon (*Ectopistes Migratorius*) that existed upon this planet. The specimen is on exhibition in the United States National Museum, to which institution it belongs. It is here given about two-thirds natural size, and this photograph of it appears for the first time.

Ocean during their migrations, into the Gulf of Mexico, or the Great Lakes. But millions upon millions of them were slaughtered by many at their regular roosting-places, and at such times untold thousands of them were allowed to rot on the ground. Often herds of hogs were turned in upon the dead and dying birds to devour them. Quite suddenly the species ceased to exist—it entirely disappeared.

At New Canaan, Connecticut, in 1872, I witnessed the tremendous flight of these big, blue pigeons; I shot only comparatively few of them, while hundreds of gunners were shooting them for the mere sport of seeing them fall. My old teacher of taxidermy, Mr. James Jenkins, remembered the countless millions of these pigeons in the flights in New York. He described their alighting by thousands upon thousands on the upper part of Manhattan Island, and on houses in Newark, Harlem, and in the outskirts of New York City and Brooklyn. A number of these birds were kept a few years ago at the Zoölogical Gardens, of Cincinnati, Ohio; and the very last Passenger Pigeon in the world, a female—"Martha"—died there early in September, 1915. That specimen was skinned by Mr. William Palmer, of the U.S. National Museum, mounted by Mr. Nelson R. Wood, taxidermist of the National Museum, and placed on a special perch, in one of the cases in an exhibition hall.

THAT wrapping twines which give thorough satisfaction can be made from paper has been demonstrated by experiments made by the Forest Products Laboratory at Madison, Wisconsin. Several hundred packages, each containing a medium-sized book, were wrapped and fastened with the lightest-weight paper twine and were mailed to various points throughout the United States. Reports show that practically every package was received in good order and that in no case was there any damage which could be charged as a fault of the twine.

THERE were cut from the National Forests in the fiscal year 1916, 604,920,000 board feet of timber. Of this amount 119,483,000 board feet was cut under free use privilege by 42,055 individuals. In all, 10,840 sales of timber were made, of which 97 per cent were under \$100 in value, indicating the extent to which the homesteader, rancher, miner, small millman, and others in need of a limited quantity of timber draw upon the Forests.

THE FOREST SERVICE REVEALS LUMBER INDUSTRY CONDITIONS

THAT unstable and partly speculative forest ownership in the West and South is the cause of frequent over-cutting of the market and waste of forest resources is announced by the Forest Service in a report just off the government press. Too large stocks of timber acquired from the public domain and too much timber speculation mixed with the manufacture of lumber, says the Service, underlie the present instability of the industry.

All this, the Service points out, concerns the lumber user. Many states are paying dearly for lumber because their own timber is largely used up and outside supplies can be obtained only at high costs for transportation. With little being done to grow new forests on cutover lands, a more widespread shortage of forest products is threatened in the future.

The Forest Service advocates various forms of open-price coöperation among lumber manufacturers to make the industry more efficient and check wasteful over-production. But it is strongly against changes in the present competitive character of the business through combinations to control output or regulate prices, even though advocated in the name of conservation.

The report contains the boiled-down conclusions of a study of timber ownership and the lumber business, undertaken by the Forest Service to find out how this business as conducted to-day affects forest conservation and the interests of the millions of users of wood in the United States, and to see whether the public policies for conserving the nation's forest wealth go far enough. It is also sought to help the industry solve the serious problems which confront it. Added weight is given to the report by the concurrence in its publication of the Federal Trade Commission, which coöperated with the Forest Service in the investigation. The Commission, however, reserves its specific conclusions or remedies for a report of its own to be published later.

THE Forest Service finds that the main problem of the lumber industry has grown out of the hundreds of billions of feet of timber acquired cheaply a few years ago from the public domain. Lumbermen in the West are carrying vast quantities of timberland beyond all possible needs of their present sawmills and logging camps. Widespread speculation during a few years of sudden development carried timber values very high, and many western stumpage holdings have been over-capitalized.

The business of making lumber, says the report, has thus been loaded down with investments in timberland. The productive branch of the industry has been interlocked too largely with speculations in its raw material; and instead of standing on its own feet as a manufacturing business, has tended to be the tail of the dog, made frequently to serve the exigencies of timber speculation. According to the report, pressure from an overload of

timber is the first cause of the general instability of the industry. For one thing, it has led to building mills beyond the demand for their products. At least a third of the saws are now idle.

On the other hand, the Forest Service reports that social and economic changes in the United States are reducing its proportionate use of lumber. Uses taken over by other structural materials within the last ten years are estimated at one-fifth of the present yearly cut of lumber; and in the same period the per capita consumption of lumber seems to have passed its peak and dropped nearly one-fourth.

CAUGHT with its burden of timberland on the one hand and these changes in the country's use of wood on the other, the lumber industry, the report points out, has been between an upper and nether millstone. The combined result is an ill-adjustment of lumber production to market requirements, with frequent, almost chronic overproduction. Ups and downs have been the rule with most manufacturers in the West and South. Occasional years of high earnings have been followed by usually longer periods of small profits or loss. The latter reached their climax in 1914 and 1915, although 1916 brought somewhat better conditions.

In the regions studied by the Forest Service, it found that lumber production, with local exceptions, is competitive, as a rule keenly so. Competition becomes still more vigorous in its struggle between different regions in selling lumber in the main consuming markets of the country.

Lumber retailing was studied in all of the Middle-Western States only. In that region the Service found it to be competitive for the most part, although its competition is less rigorous than in the case of lumber manufacturers. The restraints upon trade in lumber distribution, however, in the Central States studied, are judged to be local rather than general; and developments in recent years have tended to increase competition.

THE rising cost of lumber to consumers, which held generally up to 1907, is attributed by the Forest Service primarily to the exhaustion of the supplies of timber nearest to the bulk of eastern consumers, and the necessity of transporting lumber from greater and greater distances. Railroad freights now take a fifth or more of the consumers' price, retailers about the same amount, and manufacturers, on the average, little more than one-half. The high cost of lumber is thus due in large part to local timber shortage, resulting from the rapid using up of forests without provision for their renewal. Other causes, according to the Service, lie in the greater demands for specialized service made upon the retailer by the purchasing public, in higher labor costs, and in the decreasing purchasing power of money. Since

1937, however, the effects of overproduction have been felt, and the prices of common structural woods have made no sustained increase.

The American public, the Forest Service points out, has no responsibility to protect the security of timber investments or the outcome of speculative ventures. The welfare of many sections, however, depends in no small degree upon lumbering as a large tax payer, a gigantic employer of labor and capital, and the chief consumer of agriculture and other industries. The people of the whole country, furthermore, have a live interest in the economical use of present timber supplies and in continued forest production after logging.

THE report lays special emphasis upon the fact that such waste in the use of our natural forest wealth as is now taking place will tell inevitably in the future cost of lumber, paper, and other products manufactured from timber, as it has told already in many "cut out" states. Furthermore, under present conditions, little is being done to restock the forest lands logged for their virgin timber. The total use of wood in the United States exceeds by a good deal the aggregate growth of its forests; and unless the enormous areas of cutover land, to which millions of acres are added every year, are put to growing new forests, the Forest Service thinks that the danger of a nation-wide shortage of timber and high prices for all wood products will become acute. The unstable condition of the lumber industry, the report says, makes it unable to do much toward renewal of the forests which it has destroyed.

The experts in the Forest Service believe that a more stable kind of forest ownership, divorced from manufacture to a larger degree than now, must come about before the ills of the lumber business can be cured permanently. This kind of ownership must not only carry the present stocks of merchantable timber until the productive industry needs them, but also provide for regrowth on cutover lands. The extension of public forest ownership, both state and national, should, in the judgment of the Service, have a large part in this accomplishment.

According to the Service experts, there is no surplus of forest resources above the country's needs. There is rather a lack of forests, particularly of growing forests to take the place of the reservoirs of virgin timber now being drained. The difficulty lies, says the Service, in the wrong kind of forest ownership.

ANATIONAL mistake, the report goes on to say, was made in such rapid and wholesale passing of title to timberlands in the public domain, beyond all immediate needs for local or industrial development. Private ownership, hard pressed to carry these staggering quantities of timber during the long periods which must necessarily elapse before they can be converted into lumber, is now sacrificing them in part by wasteful use because of its own financial exigencies. The carrying of this future resource, the Forest Service declares, should have been a public rather than a private function. The report urges

that this situation be faced frankly and the obvious remedy applied, that of taking part of the western timberlands back.

Much can be accomplished also, the report says, by public and private coöperation in fire protection and in securing methods of taxation better adapted to timberlands; and, to insure the regrowth of logged-off forests, reasonable public regulation of the handling of private lands will unquestionably find a place in working out the problem.

FINALLY, the Forest Service disagrees radically with the idea now rooted in many quarters that forest conservation should be sought through permitting industrial combinations for the regulation of lumber production or control of lumber prices. It regards such developments as involving dangers to the public interests through restraint of trade so serious as to offset any possible advantages to the public from such forms of conservation as they might foster. The Service believes, in fact, that such measures as joint control of lumber output by agreement would be ineffective in holding back the pressure to cut timber and in overcoming the other weaknesses which cause overproduction. Betterment in the industry, the Service holds, must come largely through strengthening individual operators or owners, and particularly through a more stable ownership of forest lands, in which the public participates to a much larger degree than now.

The Forest Service advocates such forms of coöperation as trade associations and selling agencies, safeguarded by public supervision and regulation. But changes in the competitive status of the industry, like joint control of production or price, can, in the view of the Service, come about only with an entirely different national conception of the country's basic resources. The adjustment of public and private interests in a national policy which seeks the wisest use of forest resources and controls the industries which exploit them may then become possible, including the principle of regulating output. But in any developments of this nature, the public should have a direct and a ruling voice.

PURCHASE OF FOREST LANDS

THE acreage acquired by the Government under the Weeks forestry law during the fiscal year 1916, was more than double that acquired during the preceding year, and in excess of the total acquired under the Act from the date of its enactment in 1911 to the end of the fiscal year, 1915, according to the annual report of the Solicitor of the United States Department of Agriculture. These purchases were in Georgia, Maine, New Hampshire, North and South Carolina, Tennessee, Virginia and West Virginia.

OAK is the most suitable wood for carving, on account of its durability and toughness, without being too hard. Chestnut, American walnut, mahogany and teak are also desirable, while for fine work Italian walnut, lime, sycamore, apple, pear or plum are generally chosen.

AERIAL FOREST PATROL

By W. T. COX, State Forester of Minnesota

THE time has passed when flying machines should be looked upon as toys or experiments. They have been developed to the point where they are being used daily and with comparative safety. Within the past five years thousands of men have been trained to guide aeroplanes and hydroaeroplanes among the clouds with a greater degree of safety than any other kind of machine or conveyance can be driven at the same speed on the ground.

The European War is calling for aeronauts in increasing numbers. They are wanted to carry dispatches, to observe movements of enemy forces, and even to carry on offensive movements against the enemy. They are not only practicable and reliable as machines go, but are now considered almost indispensable for the armies.

Some years ago, when I watched the Wright brothers make the first successful flight for the Government prize at Fort Meyer, Virginia, it occurred to me that aeroplanes were certain to find a field of usefulness in forest patrol. In what other way could a large tract of forest be so quickly seen and fires detected? Since the winning of that prize at Fort Meyer, the Wright brothers and many others interested in aeronautics have been steadily and rapidly perfecting the different types of flying machines. Today they are almost as practical as the automobile.

To appreciate what the advent of the aeroplane means in patrol work, it is necessary to know what constitutes adequate forest patrol and what it costs. Let us figure a little. Ninety-nine forest fires out of every hundred can be extinguished in a few hours by one or two men if the fire is reached within half a day after it starts. That is why the rangers and their patrolmen are effective. But it costs money to maintain the right kind of a patrol force. There should be at least one man to every 72 square miles of forest, 22 to every million acres, 110 men for five million acres. The maintenance of these men for six months at \$70 per month, plus necessary equipment in the shape of canoes, tents, etc., would amount to \$49,500. This is exclusive of the cost of special fire-fighting crews, and winter work to see that loggers burn their slash. Sixty thousand dollars a year, in round numbers, would be the cost of adequately protecting five million acres of forest; and, since that area of forest land represents about \$100,000,000 worth of inflammable property, the protection cost—six hundredths of 1 per cent—is fairly low insurance. It would be a fortunate city government that could maintain its public fire department at anything like so low a rate. Nevertheless, by the use of flying machines even this low cost of protecting the forest can be reduced, particularly in a country like northeastern Minnesota, where there are so many lakes.

Five million acres represents one-quarter of the forest region needing patrol in Minnesota; it represents also the lake-dotted area of Northeastern Minnesota, which is

peculiarly adapted to patrol by the use of hydroaeroplanes or flying boats. An aeroplane, it may be stated, starts from a fairly smooth spot of ground and must alight upon a similar clear space of ground. A hydroaeroplane, as the name signifies, starts from a water surface and alights upon water. Northeastern Minnesota, with its thousands of lakes and numerous streams, is the place above all others on the continent where flying boats can be used to advantage in forest patrol. Three hydroaeroplanes and four officers are required. The machines, allowing for a life of three years, cost \$7750 a year; repairs and supplies \$100 a month, or \$600; two aviators, at \$200 per month; two observers, at \$100 per month; and a mechanic at \$80 per month, cost \$4080 for the six months annual service. This brings the total expense for six months aerial patrol for five million acres to \$12,430. The aerial patrol cannot entirely replace the foot and canoe patrolmen, because a certain number of men are needed at accessible points to respond quickly to calls when fires occur. The number of such men for five million acres varies from 20 to 30, depending upon the kind of season; an average force of 25 men should suffice. In other words, the use of flying boats for one season at a cost of \$12,430 reduces the patrol force by 85 men, whose wages would have amounted to \$38,310—a net saving in patrol cost of \$25,880.

My idea in advocating the use of hydroaeroplanes in northeastern Minnesota was that the U. S. Navy Department furnish the machines and establish a training station for aeronautics in connection with the Naval Militia Station at Duluth. The State of Minnesota might then co-operate, at slight expense, with the Federal Government in the carrying out of systematic aerial patrol. By such an arrangement, Minnesota would profit in having adequate protection over millions of acres of forest, worth to the State millions of dollars a year for timber production and recreation purposes. The United States Government would profit through protecting the Superior National Forest and through training up a corps of competent aeronauts for the national defense. The proposition was taken up with the Washington authorities more than a year ago. Secretary Daniels seems to be favorably inclined toward the plan, and it is probable that some such arrangement can be worked out in the near future.

AT the direction of the King, Spain has passed a law providing for National Parks. The measure also provides for the better protection of the fauna and the flora, according to an announcement of Consul General Hurst at Barcelona, and for a publicity department to better acquaint the traveling public with the scenery of Spain.

ANNUAL MEETING AND FORESTRY CONFERENCE

THE Thirty-seventh Annual Meeting of the American Forestry Association and the International Forestry Conference held in connection with it at Washington, D. C., January 18-19 proved to be the most largely attended forestry meeting ever held in this country. Not only did members of the Association attend in large numbers, but delegations from many of the states and from several of the provinces in Canada were present.

The sessions were devoted to three main topics: recreational uses of National Forests and Parks and conservation of game on each; reports, addresses and discussions on the white pine blister disease and how to fight it; and addresses and discussions on the advisability of a national quarantine against the importation of tree and plant stock from other continents in the effort to keep out of this country the tree and plant diseases which now do hundreds of millions of dollars, damage each year.

At the annual business meeting of the American Forestry Association the officers were elected as follows: President; Charles Lathrop Pack of New Jersey.

Vice-presidents: Andrew Carnegie, New York; William E. Colby, California; Coleman Dupont, Delaware; Dr. Charles W. Eliot, Massachusetts; Dr. B. E. Fernow, Canada; Henry S. Graves, District of Columbia; Everitt G. Griggs, Washington; Hon. David Houston, Secretary of Agriculture; Hon. Franklin K. Lane, Secretary of the Interior; Hon. Asbury F. Lever, South Carolina; Hon. Thomas Nelson Page, Ambassador to Italy; Gifford Pinchot, Pennsylvania; Mrs. Frances Folsom Preston, New Jersey; Filibert Roth, Michigan; Dr. J. T. Rothrock, Pennsylvania; Mrs. John D. Sherman, Illinois; Hon. Wm. H. Taft, Connecticut; Joseph N. Teal, Oregon; Theodore N. Vail, Vermont; Hon. John Weeks, Massachusetts; Dr. Robert S. Woodward, Washington, D. C.

Treasurer, John E. Jenks, Washington, D. C.

Directors, John S. Ames, Massachusetts; W. B. Greeley, Washington, D. C.; Alfred Gaskill, New Jersey; Chester W. Lyman, New York; and Charles Lathrop Pack, New Jersey.

At the morning session the address was on "Economic Justice for Lumber and Forests" by E. A. Sterling of Chicago, a director of the American Forestry Association.

In the afternoon the addresses were, "National Parks as National Playgrounds," by Robert Sterling Yard of the Department of National Parks; "Recreational Uses of the National Forests," by Henry S. Graves, Chief Forester, U. S. Department of Agriculture; "Conservation of Game in National Forests and National Parks," by E. W. Nelson, Chief of the Bureau of Biological Survey; and a film story, "Attractions of the National Forests," by C. J. Blanchard, Statistician of the U. S. Reclamation Service.

The morning of the second day was devoted to the pine blister disease situation. The disease was discussed by Dr. Perley Spaulding, U. S. Forest Pathologist; and the situation was described in four great divisions as follows: In New England, by W. P. Wharton of Massa-

chusetts; between the Hudson and the Mississippi by E. A. Sterling of Illinois; on the Pacific Coast by E. T. Allen of Oregon; and in Canada by Clyde Leavitt of Canada. S. B. Detwiler, U. S. Forest Pathologist gave his views on what should be done about the disease; C. R. Pettis, Superintendent of the New York State Forests, discussed the advisability of planting white pine; and Dr. Haven Metcalf, chief of the U. S. Office of Forest Pathology, discussed the problem as a whole.

The substance of these papers and the resolutions regarding the situation as passed by the Conference will be found on another page.

At the concluding session in the afternoon C. L. Marlatt, Chairman of the Federal Horticultural Board, spoke on "The Losses Caused by Imported Tree and Plant Pests"; a paper by David T. Fairchild, Agricultural Explorer in Charge of the Office of Foreign Seed and Plant Introduction on "The Independence of American Nurseries" was read by his assistant, Mr. P. H. Dorsett, and J. G. Sanders, Economic Zoölogist of Pennsylvania, spoke on "The Necessity for a Federal Quarantine Against Tree and Plant Importations." These papers will be found in the magazine.

A fitting climax to the two days of hard work, serious addresses and discussions, committee meetings, etc., was the smoker given on the last evening of the meeting to the visiting members and delegates by the American Forestry Association. President Charles Lathrop Pack presided and there were informal addresses, music and lunch.

THE RESOLUTIONS

The resolutions adopted by the Forestry Conference, with the exception of the resolution relating to the pine blister disease, which will be found on another page, were as follows:

THE BOY SCOUTS

RESOLVED, That the American Forestry Association recognizes The Boy Scouts of America as a movement from which great good has already resulted in Planting Trees and in the prevention of and fighting forest fires, and that under proper direction the Boy Scouts may become one of the great factors in the cause of forestry and conservation.

And it recommends to the Board of Directors the appointment of a committee of three to consult with the officials of the Boy Scouts of America to formulate a proper working plan which the Boy Scouts can put in operation in all parts of the United States, said plan to cover all matters in forestry and conservation that a boy should know.

SCHOOL STUDY OF TREES AND FORESTS

Whereas, The child is the heart of society. The secret of permanency lies in its training through the medium of our public school system.

If America is going to conserve her forests, if the dangers from fire, pests and diseases such as the chestnut blight and white pine blister are to be fully appreciated, then it is imperative that our public schools become vitally interested in these subjects.

THEREFORE, BE IT RESOLVED: That the American Forestry Association favors the suggestion that the Departments of Public Instruction of the several states in the Union, encourage in their public schools the study of our native trees and forests, with special emphasis on their growth, proper development and preservation from disease and destruction by fire; and to encourage the planting of shade trees on all school grounds, home grounds and surroundings and along public highways.

LOUISIANA FORESTRY WORK

Whereas, The recent act of the 1916 session of the Legislature of Louisiana, effective January, 1918, which provides that the State Forestry work be in charge of a trained forester, and that the expenditures for Forestry work shall equal twenty per cent of the income derived from the products tax on timber and turpentine, marks a great forward step in that State for forest conservation, therefore be it

RESOLVED, That the American Forestry Association heartily commends and endorses this action of Louisiana, and that a copy of this resolution be sent to the Governor of Louisiana.

PROTECTING MIGRATORY BIRDS

RESOLVED, That the American Forestry Association respectfully urges the present Congress to make effective, through the necessary legislative action, the recently ratified Convention between the United States and Great Britain for the protection of useful migratory birds.

Speedy action is desirable in view of the increasing economic loss to all the people, which must ensue if action be deferred until the next Congress.

STATE FORESTRY WORK

RESOLVED, That the American Forestry Association commends the progress which has been made in independent State forestry work as shown by the existing State Forestry Departments and deplores any effort or tendency to subordinate this work to that of other Departments which might weaken its influence or eliminate technically trained foresters, such changes in organization not being conducive to efficiency or to the best forest interests of any state.

BE IT FURTHER RESOLVED, That a copy of this resolution be sent to the governor of every State.

FOREST AND LUMBER PROBLEMS

UNDERSTANDING that our Federal Departments dealing with forest and lumber problems have under consideration the formation of an Advisory Board to enable permanent

and systematic consultation with forest and lumber interests, we advocate such a board as contributing to the development of a comprehensive American forestry policy.

A NATIONAL QUARANTINE

In view of the spread of diseases and insect pests introduced from foreign countries, such as chestnut blight, gypsy moth and white pine blister.

RESOLVED, That the American Forestry Association favor the principle of absolute national quarantine on plants, trees and nursery stock, to take effect at the earliest date which may be found economically expedient.

TREES IN THE WAR ZONE

THE struggle of the trees for existence in the battle-swept fields of Europe is one of the things that stands out in the memory of Will Irwin, war correspondent, recently returned from Europe.

"I was never quite so impressed," said Irwin, "and there are many things one will never forget after a visit to those battle-fronts, as I was with the trees and their pathetic endeavor to live where man had given up the struggle and there were heaps of dead to testify to his heroism.

"At Verdun I saw the blackened stumps from which the mighty trunks had been shot away. Clustered around their base I would find a little shoot or two bravely sending forth its green to gladden a sorry place. Time and again on trunks that had been left standing blackened and almost stripped of bark, so fierce had been the fire, I found tiny leaves coming forth—for it was April—and those trees still had life enough left to answer to Nature who goes on and on despite the quarrels of humanity.

"It was the same on the Italian front which I visited. There the fighting has been as fierce as anywhere in Europe, although we have not heard so much about it. I found Nature putting forth her foliage in a feeble way among the crags and the rocks and all this despite the terrific gun fire and spreading of death-dealing gases which no human being had been able to withstand.

"The willow is playing a wonderful part in the war. The Italians particularly are using it to weave masks and deceptive fronts for their trenches."

AN ACKNOWLEDGMENT

AMERICAN FORESTRY is very glad to acknowledge the assistance and coöperation of the U. S.

Forest Service in furnishing photographs and necessary data for the preparation of the following articles which have appeared in the magazine from time to time: September, 1915, Longleaf of Pine; October, 1915, Chestnut; November, 1915, Sugar Maple; April, 1916, White or Paper Birch; August, 1916, Mockernut Hickory.

WE TAKE PLEASURE IN ANNOUNCING THAT WE HAVE ON HAND JUST TEN COPIES OF THE REPORT OF THE PROCEEDINGS OF THE SOUTHERN FORESTRY CONGRESS, HELD AT ASHEVILLE, NORTH CAROLINA, FROM JULY 11-16, 1916, AND THESE MAY BE PURCHASED FOR ONE DOLLAR EACH, BY MAKING APPLICATION TO THE OFFICE OF THE AMERICAN FORESTRY ASSOCIATION, WASHINGTON, D. C.

EDITORIAL

THE ECONOMIC NECESSITY FOR PUBLIC FOREST OWNERSHIP

THE most striking fact brought out in the report on "Some Public and Economic Aspects of the Lumber Industry," just published by the Forest Service, is the economic need for publicly owned forests. Nearly every starting point in the consideration of this many-sided question leads to the conclusion that private forest ownership under the conditions existing in a large part of the United States has not made good from the standpoint either of the public or of the timber-using industries; and that a large infusion of public forest ownership is the alternative.

There is little use in crying over spilt milk or in trying to find a scapegoat to which responsibility can be fixed. The situation itself was inevitable. The people of the United States deliberately and in pursuit of more or less clearly defined purposes gave away by far the greater part of the forest resources originally held in common. The method of the giving made speculation in timberlands and their subsequent high capitalization a certainty. The concentration of a large share of the timberlands into enormous individual holdings was also an inevitable feature of the system. That timber speculation should be mixed liberally with the manufacture of lumber followed from the method of disposing of public lands with the absolute sequence of night and day. It was unavoidable that the sawmill should often become the cat's-paw of the timber buyer, to pull some speculative venture out of the fire.

All of these things are parts of a whole. They relate back to the conception of public resources and the uses they should serve which dominated the country during the last half of the last century.

And like nearly all such movements, with their many human and dynamic aspects, the wholesale distribution of the public forest lands accomplished some good. It promoted the settlement of the West, built up its taxable values, stimulated its industrial growth. The things that this method of treating public resources set out to do were actually done in part. But the country must now reckon with the cost. The study made by the Forest Service shows very plainly that private ownership assumed, in the days of feverish development in the Western States, a task beyond its strength; that the "overload" of timber thus created has become the principal source of unstable conditions in the lumber industry and the principal cause of a more or less wasteful use of the country's forests.

The bad results of a more or less temporary and speculative kind of forest ownership are not restricted to the lumber industry; nor are they restricted to the states where the passage of title from public to private hands is still fresh in men's minds. There can be little question from this review of forest conditions throughout the

country that the economic value of the forests of the United States to its people and industries as a whole is in part being destroyed by the wasteful use of these forests which the conditions created by private ownership have forced upon the lumber industry, and by the inability of the industry to replace old forests with new. The report of the Forest Service goes to show that there are upwards of three hundred millions of acres of cutover forest lands in the United States. On the greater proportion of this vast acreage there is little forest production or a production representing but a small part of the growing capacity of the land. It is a safe assumption that the cost of freight on the average thousand feet of lumber used in the United States is increasing from year to year. In the Middle West freight charges have already exceeded 22½ per cent of the cost of lumber to its consumers. This is pointed out as the primary reason why the cost of lumber has gone up. It is one large reason why the per capita consumption of lumber in the country has fallen; in other words, why the people have been forced to practice greater economy in the use of wood. It is becoming more dear because it has to be hauled farther.

In parts of Europe where forest production is maintained only by the practice of very intensive methods, the common forms of building lumber cost no more than in the older portions of the United States. This is primarily because the lumber is grown, manufactured and used at home. Transportation upon it is a negligible factor. The forest history of the United States, on the other hand, is a series of widening circles representing local timber shortages and reflected in rising lumber prices proportionate with the greater distance which the material had to be transported. Where shall we stop? As between shipping ordinary building lumber from Louisiana to Philadelphia or from Puget Sound to Philadelphia and from Siberia to Philadelphia, the question is solely one of degree. The timber famine is not a bogey of the future. It is the necessity for reduced consumption, brought about by higher prices, which are brought about in turn by a shortage of nearby forests.

All of these things we may say have been inevitable. They have resulted from a more or less deliberate course followed by the United States in its economic development. The only new feature is that we are finding it a little harder all the time to reckon with the piper. Are we, supposed to excel as a nation in common sense and in ability to grasp and apply economic facts, to continue to reckon with the piper; or are we going to the bottom of a national economic weakness and build up aright? Can we permit continued wasteful use of the great reservoirs of virgin timber remaining in the West, because private ownership has created certain conditions of

capitalization which have got to be met? Can we afford to let a large part of our potential forest production lie idle?

If the conditions set forth in the report of the Forest Service may be taken as a safe guide, forest ownership is at the bottom of the whole business. A different kind of forest ownership is necessary to give the lumber business stability and to meet the permanent needs of the United States for wood. Other things, like many forms of industrial coöperation, are necessary, but after all are largely palliatives rather than real cures. Permanence in the ownership and management of forest lands is the ultimate remedy. The public forest policy should address itself to that accomplishment. The Government report points out possibilities of a more stable kind of private ownership—and they should receive every legitimate encouragement. But the clear necessity remains for the wide extension of public forest ownership, both state and federal.

A large measure of public forest ownership has been necessary to the development of forestry in most of the countries of Europe and, if the findings of the Forest Service are to be accepted, the United States will prove no exception to the rule. Public agencies, state and federal, now own or control about one-fifth of the forest lands in the United States. A material increase in this proportion would inject more stability into the forest-using industries and give the country better assurance of

a future supply of wood adequate to its needs than any other step which could possibly be taken.

The final answer, of course, must be the practice of forestry on all lands suited to forest production, whether made possible by economic conditions or brought about through public regulation of the handling of private forest lands. The general practice of forestry would not only keep up production somewhere near, at least, the wood-using requirements of the country, but would also by its corresponding limitations upon the amount of material cut from the forests stabilize the industries using them. But this happy solution, while the goal which should never be lost sight of, can not come to pass over night. The process must be one of adjustment, in the investments represented by timberlands and manufacturing plants, in legislation, in more intelligent use of land, in the use of wood in relation to other materials. Definite and clear-cut leadership is needed to point out the way. This must be furnished by the state and nation. Public forest holdings in one form or another should be enlarged to the point which will bring about at least some measure of regrowth in cut-out regions, which will lay the basis for some degree of permanence in the forest-using industries in all regions, and which will give the consumers of the country a reasonable degree of protection in the shifts and changes in the supply of forest products.

SHALL WE SUCCEED IN SAVING OUR WHITE PINE?

THE fight against the imported white pine blister disease, starting as guerilla warfare in 1909, and suddenly developing into a general attack early in 1916, has now reached a critical stage. The enemy, taking advantage of our lack of preparedness, has in this seven year period gained an almost impregnable position in New England, and his advance forces of invasion penetrate to Minnesota and unless quarantining proves efficient, may appear with the coming season in the Rocky Mountains and West Coast States. So insidious is this foe, spreading silently and unobserved by the dissemination of millions of minute spores borne on the wind, that the problem of eradication—as we now realize—calls for the highest type of intelligent leadership. Until this year, it was assumed that the disease could be confined to the plantations made from imported white pines, and no effort was made to scout for its presence in the areas of native pine, until outbreaks were reported of so serious a nature that the Massachusetts Forestry Association became alarmed, and, aided by the Bureau of Plant Industry in the U. S. Department of Agriculture, the American Forestry Association, and the coöperation of certain of the State Foresters, secured funds from Congress and state Legislatures for a general survey to discover its extent and prevalence.

At the close of the season these facts must be accepted as beyond dispute: first, that the disease has gained such a foothold and spreads so rapidly on currants, that it can be checked only by the extermination of either the pines

or the currants bordering on infected areas. Second, that the disease is fatal to all young or small white pines, and is probably equally fatal, though slower in its operation, on mature trees. We quote the field agent of the Bureau of Plant Industry, a man of thorough experience and training, whose judgment should be final.

"In southern Maine, on 5 acres of native pine containing 1000 to 1500 trees per acre from 1 foot high up to 2 feet in diameter, we found nearly 90 per cent infected, and over half the trees already killed or so seriously infected that death is certain. One tree, 15 inches in diameter and 50 feet high, had the trunk girdled 20 feet from the ground, and every main branch of the tree, about 100 in number, diseased. Somewhat similar conditions, on a smaller scale, exist in southern New Hampshire."

Girdling by this disease causes death within the same season. Such facts are conclusive. Southern New Hampshire is the region of most rapid and thrifty growth of white pine, showing that the disease attacks all trees of this species whether sickly or vigorous.

We must either exterminate or quarantine the blister disease, or the white pine is doomed.

To do this we demand united support and will no longer tolerate evasion or misrepresentation on the part of those who have either failed to inform themselves of these facts or who for any other reason wish to keep the public in ignorance of the truth. We quote from a public address recently given by an eastern official:

"In no case, as far as the writer is aware, is there any infection of sufficient magnitude to destroy a stand of white pine of any appreciable size. * * * In most cases the trees (infected) were growing in abnormal conditions and were equally unhealthy from an unfavorable environment and were infested with all the other diseases and insect enemies common to their kind. * * * Plantations of native stock are practically free from the disease * * * More harm than good has been done by the unnecessary agitation in the publicity campaign so systematically carried on at a great expense exciting people over a subject about which enough is not yet known by experts themselves. * * * We have millions of trees in our nurseries ready to go out, and all at once under the guise of public-spirited coöperation, and before there has been sufficient evidence, a campaign is set in motion to discourage and thwart all our laudable reforestation endeavors. * * * It is to be hoped that the average citizen will go ahead planting white pine as enthusiastically as ever."

This same official, after attending the first conference in 1909 in New York to consider the suppression of the blister disease, not only failed to warn the public of the danger, but in a bulletin issued in 1910 included a list of European nurserymen from whom white pines could be imported, heading this list with the name of J. Heins Sohne (Sons), Halstenbeck, Germany, the very firm whose diseased stock had given occasion for calling the confer-

ence. And the state which has suffered the most and has apparently been the center of infection for surrounding states, is the one whose citizens received this guidance and advice, and who are now urged to continue enthusiastically planting white pine, and "to leave the problem of its protection from diseases and insects to be looked after by technically trained officials."

State foresters *who have been technically trained in forestry* have in every instance met the situation courageously and wisely. They realize that until the nation and the states affected have shown the possibility of controlling this disease, that the planting of white pine is attended with extreme risk, and they are willing to sacrifice a few thousand or million white pines in nursery stock rather than run the risk of reproach at a future period for neglect to warn the prospective tree planter. The white pine, while our best, is not our only northern pine. Until this menace is removed, safety can only be secured by mixing red or Norway pine with the white pine in plantations, or discontinuing its planting altogether.

Meanwhile, the efforts of the American Forestry Association will be continued, and it is hoped that all friends of forestry will unite in an endeavor to secure from Congress an adequate appropriation, and from the states the necessary legislation and financial aid in overcoming this disease and preserving to our American civilization the white pine, the noblest tree in all our eastern woodlands.

SHALL WE CHEAPEN OUR NATIONAL PARKS?

THIRTEEN bills are before Congress for the creation of thirteen new National Parks, most of them from areas already under administration as National Forests. Some of these projects, notably that of Mount Whitney in Alaska, are worthy of adoption. But unless Congress is guided in this legislation by something more than the passing whim of some congressman or his constituents, and acts upon clearly defined principles, lasting harm may be done to the cause of National Parks in the west.

Park uses satisfy the needs of but one side of human nature—the demand for recreation. Forest areas supply equally important and vital needs, for shelter, clothing, food, light and power, through the development and use of the timber, grazing and waterpowers.

The older civilized countries cannot afford and do not attempt to exclude these commercial uses from large tracts of productive forest land, in order that the æsthetic sense alone may be gratified. To do this would mean an economic waste which would take visible form in lack of employment, poverty and hunger and the forced emigration of a considerable portion of the local population.

But these communities do not ignore the finer sensibilities of their people, nor overlook the recreational possibilities of their forests. On the contrary, the public woodlands are developed into extensive pleasure grounds by paths and roads. Rest houses are provided for the tourist, and every spot of exceptional beauty or interest is carefully protected and made if possible more attractive.

Our National Forests are devoted primarily to similar economic ends. And what is true in Europe has already

been demonstrated in their management—that recreational uses can be protected and developed on the same areas, by the preservation of strips of timber along water courses, lakes, roads and trails. In this way the highest possible use is made of all portions of the area. Such a policy means stability and permanence.

But what about our National Parks? Will our people, educated by more than a generation of administration for the Yellowstone, the Yosemite, and the Sequoia with its grand trees, abandon the ideal which they have formed of vast spaces untouched by commercial greed, and permit the utilization of the forests, the grazing of the forage by sheep and cattle, and the harnessing of these waterpowers, in these last remnants of our national heritage, the once boundless western wilds? Such a policy is unheard of. As a nation, we intend to hold these parks as they are, and woe betide the influences which may seek to invade them. In the words of Frederick Law Olmsted, one of our foremost landscape architects, "The National Parks are set apart primarily in order to preserve to the people for all time the opportunity of a peculiar kind of enjoyment and recreation not measurable in economic units, and to be obtained only from the remarkable scenery which they contain—scenery of those primeval types which are in most parts of the world rapidly vanishing for all eternity before the increased thoroughness of the economic use of the land."

The ideal here set forth rings true to our national conceptions. It is going to be physically impossible, and wholly undesirable, to attempt to segregate all of our recreational areas as parks. There is not one of our

National Forests but what contains many such areas. *Scenery, and that of a strikingly unusual type, is the distinctive note, for which we expect to pay the price of complete protection from commercialism.* If, by the creation of numerous more or less mediocre National Park areas, we destroy this distinction, and at the same time, throw a sop to local economic needs by breaking down the barriers to grazing, timber cutting and power development, our National Parks will cease to differ in any important respect from the National Forests out of which practically all of them must be created.

With this obliteration of ideals long held and closely cherished, the need for a separate administration of park areas from forest areas will lose its force, and become a drawback and embarrassment instead of an advantage. There would be no valid reason for permitting the Interior Department, by the mere declaration in Congress of the creation of a park out of a National Forest, to take over the administration of the area, if its management permits and requires an exact duplication of all the commercial uses and policies now being supplied by the Department of Agriculture. The common sense of the public will fail to see the advantage of such duplication of administration.

The evils to which we are endeavoring to call the attention of Congress, are embodied in such bills as S. 3486, for the Olympic National Park; S. 3982, to establish a

National Park including Mount Baker; H.R. 16239, for a National Park to be taken from the Angeles National Forest in Southern California. S. 3036, for a Cabinet National Park near Glacier Park, Montana, and certain others, including S. 5913, to greatly enlarge the Sequoia National Park at the expense of the surrounding National Forest areas.

The friends of our parks, and of our National Forests, and the advocates of their continued separate administration, should be vigilant to prevent such hybridization and cheapening of the National Park system, that we may hold fast to a unique national luxury—nay, a necessity—which no others can afford—and which lends to the West its most distinctive charm for the traveler who desires to see the wonders of his own country.

In conclusion, we wish to again call attention to the failure of Congress to pass the bill, H.R. 20447, urged by both Agricultural and Interior Departments, for the creation of a National Park of the Grand Canyon of Arizona, and respectfully suggest that there exists no valid excuse for such neglect. The Grand Canyon needs no defenders. How does it happen that it has no champions in Congress? The public will expect from its representatives a wise, consistent and far-sighted policy in the creation of additional National Parks. Let us begin with the Grand Canyon of Arizona.

DOES STATE FORESTRY NEED "REORGANIZATION?"

WITH the increasing responsibilities of modern conditions, and a higher standard of public service, old forms of state executive machinery are being weighed in the balance, and found wanting. Steadily mounting state expenditures have stirred our legislatures and executives to inquire into the efficiency and economy of the present conduct of public business, not for the purpose of summary retrenchment by the crippling of useful departments, but in order to eliminate actual waste and get the highest possible returns in service for each dollar expended.

Waste in public administration has been so common that many are tempted to cynically accept the condition as inevitable. Such an attitude is unworthy of a strong nation. When we have grasped the principles upon which efficiency is based, we shall apply them without fear or favor. In determining these principles we are not without guidance. The secret of efficiency is the capable executive; the man of trained mind, initiative, resourcefulness and integrity. *Such men must be secured and retained by any business, public or private.* Mediocrity and inefficiency in men who occupy responsible positions is the direct cause of failure, graft, special privilege, and all the familiar evils which have disgraced our public affairs.

But these evils are equally possible in private enterprise and have wrecked many business structures. In private business such losses mean destruction, and the additional pressure for results has secured far greater efficiency. The form of organization which has grown

from these needs has special significance to the seeker after first principles.

Large private corporations which have grown beyond the ability of a single man and, in this, resemble state organizations, invariably rule their affairs through a board of directors. Their functions are clearly defined. They determine the general policy of the institution, select the executive, and hold him responsible for results. The board scrupulously refrains from meddlesome interference with the details of management, while the executive is equally careful not to usurp the prerogatives of the board or assume responsibility for innovations in policy requiring their sanction. Nor do private corporations make the mistake of combining two or more dissimilar lines of work under a single manager, well knowing that the secret of success is a clear-cut concentration on familiar lines. Where two such projects are controlled by the same interests, a separate organization, even to the board of directors, is effected for each, as a fundamental requisite of success.

Public business is still groping in the dark after these facts,—yet for the last decade, state forestry, as well as many state educational institutions have demonstrated conclusively that this same plan is as fully effective in public as in private affairs. Boards without an executive are foredoomed to failure—and there are many such state boards. But in forestry, the insistence on the appointment of trained foresters has, in eighteen out of twenty-seven states, provided this executive. When

appointed by the board, and thus placed upon a basis of merit rather than politics, such executives have not failed in a single instance to faithfully and vigorously perform their duties. Fire protection has become an actual fact, rangers give honest service, forestry education and general knowledge is advanced rapidly, and the confidence of the public is secured.

By contrast, in those states which have either blindly or with deliberate intent combined state forestry with other departments, subordinated the forester to a chief whose head is full of a number of other interests, and removed the stabilizing element of the board, state forestry has either failed to develop or has received a severe setback. Equally poor results have followed when a state, although retaining a separate forestry depart-

ment, resorts to the principle of direct appointment of the forester. From close study of the actual results of state forestry since its first beginnings, these conclusions stand out in a manner absolutely convincing. Only ignorance of the facts or wilful desire to corrupt and make partisan use of forestry departmental machinery and appropriations can form any excuse for reorganizing a State Forest Service established along these lines. Yet strong efforts are being made in more than one state to do this very thing. Let the friends of efficiency and of honest government beware of these specious attempts and hold fast to what is good; or in another decade we shall face the task of reconstructing our forestry departments on the same lines as at present, from the ruins of our attempts to "better" them by fusion and reorganization.

IN THE FRENCH FORESTS

H. D. JEWETT, a graduate of Wyman's School of the Woods, and well known by foresters, who is now a member of the American Ambulance Corps serving in France, writes:

"At our present location I am fortunate in being near some small forests where I have a chance to see some of the French forestry in practice. Some of the Service Forestier men are in the woods here and the Boche prisoners do most of the work. About all the hardwoods are oak and beech but the beech, especially, seems better than what we have at home. There is a beautiful pine (maritime) nursery about eight years old. The spruce plantations here are failures because the soil is the poor limestone variety. The woods are all divided into compartments, etc. such as we studied in "Working Plans." There has been a small mill erected near our camp where they are turning out lumber for war purposes; mostly boards for portable houses and heavy timbers for dugouts, etc. There are many German prisoners working in the mill and they seem to be glad they are not in the trenches. Wood is certainly valuable here as we cannot even pick up the dead wood in the forests, and each camp has a regular wood ration. They have made thinnings in many of the woods for fuel and when the operation is finished the woods look like a park. The leaves are about the only part of the tree not used. The French foresters seem a good lot but I can't talk very fully with them because of my slight knowledge of the language. I hope to see more of the real French forests before coming home."

THAT England and Germany, with their realization of the need for conservation of national resources, are far more particular about the use of creosoted timber for heavy construction work than the United States, and the lesson for the United States in this attitude, is a feature of a forest service bulletin issued by the United States Department of Agriculture in cooperation with the American Wood-Preservers' Association, the bulletin being written by R. K. Helphenstine, Jr., of the federal forest service.

MONEY FOR ROADS AND TRAILS

SECRETARY HOUSTON has announced the amount allotted to each State from the million dollars to be spent during the fiscal year 1918 in constructing roads and trails within or partly within the National Forests. This money is part of the ten million dollars appropriated by the Federal Aid Road Act to assist development of the National Forests, which becomes available at the rate of a million dollars a year for ten years.

The allotments as approved are as follows: Alaska, \$46,354; Arizona, \$58,604; Arkansas, \$9,803; California, \$140,988; Colorado, \$62,575; Idaho, \$108,730; Montana, \$70,042; Nevada, \$19,296; New Mexico, \$42,495; Oregon, \$128,111; South Dakota, \$8,092; Utah, \$41,167; Washington, \$91,944; Wyoming, \$40,684. A total of \$9,995 has been allotted to Florida, Michigan, Minnesota, Nebraska, North Dakota, and Oklahoma. The group of Eastern States—Georgia, Maine, New Hampshire, North and South Carolina, Tennessee, Virginia, and West Virginia—in which the Government is purchasing lands for National Forests, receives \$21,120.

In making allotments, it is explained, ten per cent of the amount available for 1918 is withheld as a contingent fund. One-half of the remainder has been apportioned among the states in amounts based on the area of the National Forest lands in each state, while the other half has been allotted on a basis of the estimated value of the timber and forage resources which the Forest contains.

THE number of fires suppressed on National Forest lands during the calendar year 1915 was 6,324, as against 7,018 in 1914, and an average annual number of 4,759 during the past five years, says Henry S. Graves, Chief of the Forest Service, in his annual report just published. While more than the average number of fires occurred, the timbered area burned over was but 155,416 acres, or 30 per cent less than the average per year for the period 1911-1915 inclusive. The average loss per fire was \$60.41. Forty-four per cent of the fires were confined to areas of less than one-quarter of an acre.

BOOK REVIEWS

The Story of the Forest, by J. Gordon Dorrance, of the Maryland State Board of Forestry. The American Book Co., New York, 232 pages. Price, 65 cents.

The author in a most interesting and instructive way tells the younger generation what the woodlands of the country are and what they mean. The book is particularly of service in the schools. It tells of the forests of America; of the tree and how it lives and dies; of how to know trees; of work in the woods; of the by-products of the forests and of the most famous trees in American history.

Tree Wounds and Diseases, by A. D. Webster. J. B. Lippincott Company, Philadelphia, 215 pages, \$2.50 net.

Here is a book which will fill a public need. Everybody loves trees, many own them. When a tree is sick, diseased or injured the owner rarely knows what to do for it. This book clearly and simply tells what to do and how to do it. The illustrations add considerably to the practical instruction given. The advice will be of service to every tree lover and tree owner.

Southern Forestry Congress Proceedings, Price, \$1.00.

In this is a compilation of the addresses presented at the Southern Forestry Congress, at Asheville, North Carolina, last July. The book contains nearly 200 pages, is neatly printed and attractively bound and should be on the shelf of every Southern lumberman, forester and landowner.

The Well-Considered Garden, by Mrs. Frances King. Charles Scribner's Sons, New York, 290 pages.

This attractive book, profusely illustrated, is by an author whose practical knowledge, keen insight, and splendid enthusiasm combine to make her so well fitted to instruct, advise and inspire lovers of plants and gardens that it will be found by all of these of unusual practical value.

The Book of Forestry, by Frederick Franklin Moon. D. Appleton & Company, New York, 315 pages.

The author, who is professor of forest engineering at the New York State College of Forestry at Syracuse, states in his preface that "The American people are by inheritance a nation of forest butchers" and he therefore aims in the book to awaken a love of the forest in the heart of young America, and a realization that forestry is necessary for the comfort, health and prosperity of future generations.

Hand-book for Rangers and Woodsmen, by Jay L. B. Taylor. John Wiley & Sons, Inc., New York City, 420 pages, \$2.50 net.

The author is a forest ranger in the United States Forest Service and, realizing the need of such a volume as this to serve as a guide for inexperienced men in woods work, he wrote it. It is so complete in

detailed description and in illustration that it is most valuable. While the book is primarily intended to describe the problems confronting the forest ranger, it is also of use to others whose work or recreation takes

them into rough and unsettled regions. The book covers in considerable detail problems dealing with equipment, construction work, general field work, live stock and miscellaneous conditions.

CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY, CANADIAN SOCIETY
OF FOREST ENGINEERS

Suggestions are being made to farmers who have some rough land on their farms, to plant balsam for Christmas trees. They do not take long to grow and should prove a profitable crop.

Practically all of the paper and pulp mills in Canada are preparing to increase their output and many new mills will be built.

The Pulp and Paper Magazine of Canada comes out in a new cover and will hereafter appear as a weekly. This paper is keeping step with the growth of the industry whose organ it is, and is a very creditable one.

The fourth annual meeting of The Canadian Pulp and Paper Association took place January 31st, and was addressed by Sir George Foster, Minister of Trade and Commerce. At the banquet in the evening Sir Robert Laird Borden, Prime Minister of the Dominion, responded to the toast of "Our Country." The Technical Section met on the 30th and 31st. Mr. Herman Guettler read a paper on the "American Barking Drum" and Dr. Bjarne Johnson, one on the "Chemistry of Wood," and there was a general discussion on "The Handling of Wood in Pulp Mills."

In February Mr. Henry Sorgius, Manager of the St. Maurice Forest Protective Association, will be sent on a tour of the Province, by the Department of Lands and Forests, to try to get the limit holders who are not already members of the Coöperative Associations to form new ones in their respective districts.

On February first and second, in the rooms of the Montreal Board of Trade, was held the first general conference on Forest Fire Protection in Eastern Canada. It was under the joint auspices of the Lower Ottawa and St. Maurice Forest Protective Associations and consisted of short papers, by men prominent in different phases of protective work, followed by informal general discussion. Mr. T. B. Wyman, of the Northern Forest Protective Association, Mr. Clyde Leavitt of the Dominion Conservation Commission and other prominent men took part. The subject of the white pine blister rust was discussed. A very important question was also brought up, i.e., the protection of forest areas which

are at present of no commercial value, such as young growth, burnt over territory, second growth, and timber without commercial value, owing to its inaccessibility.

The work of the New Brunswick forest survey is proceeding satisfactorily and at low cost. About 375,000 acres have already been covered. Maps have been made showing the holdings of the Government, boundary lines, drainage, etc., the kinds and amounts of timber and the kinds of soil. The cost has been, including the office work, only 4¼ cents per acre, which is very creditable. This survey will set a Provincial record for thorough and comprehensive work and will put the Province of New Brunswick in a splendid position to lay out future plans for the management of its forests, the regulation of its cut, protection work, etc., and will give all the data necessary for the proper classification of lands so that only those which are really agricultural shall be opened for settlement.

The soil map shows the character of the soil by broad physical types, such as clays, clay-loams, sand-loams, sand soils and swamp soils. The presence of surface and sub-surface stones are also shown, with areas too steep and rugged for cultivation. The timber maps show the main topographic features, and the timber by broad types, with the estimate based on types. This gives the board feet per acre, and the percentage of the different species entering into the estimate.

In the United States, neither the public generally nor the foresters, seem to be aware of the rapid progress which forestry is making in Canada. Almost all of the Provinces now have active and efficient Forestry Services as has the Dominion Government. Fire protection has made rapid progress and public sentiment has reached a point where forest fires will soon be a thing of the past. Public opinion will hold those responsible for poor protection strictly responsible. Proper exploitation is becoming more and more the rule, especially with the pulp and paper companies. A beginning has also been made along silvicultural lines and people at large are beginning to realize that trees must be grown as crops. A large amount of experimental work is being carried on and the outlook for proper utilization and conservation of our forest resources is decidedly bright.



THE GIGANTIC ROOSEVELT DAM WHICH HAS BROUGHT WATER TO THOUSANDS OF DESERT ACRES

THE LURE OF APACHE LAND

BY RUSSELL T. EDWARDS

"'Neath that inverted bowl we call the sky," as Omar sang at the wall of a Persian garden, there is no finer work of the Master Artist in all the world than the colored glories of Apache Land—a land full of the mystery of the Redman's lore that has come down through the ages to a country that then was old when the Spaniard Coronado passed that way. The cry of the fierce Apache long has been stilled. Instead, the purr of the motor attunes softly with the colorings that were born of a god-like wrath when Morning Green (the Creator) cursed the land with desert wastes and swore nothing there should bloom again. He left the wonder-colorings to taunt the savage who had rebelled and to be forever a sign that the gods were superior to men.

And so it seems

The Moving Finger writes; and, having writ,
Moves on; nor all thy Piety nor Wit
Shall lure it back to cancel half a Line,
Nor all thy tears wash out a Word of it.

But old Omar, despite his wine-visioned prophecies, dreamed not the power of man, for there on the Apache Trail today that handiwork of man, the Roosevelt Dam, makes the god-cursed desert bloom and stands second only in the wonder spots of the handiwork of Nature herself, as if mocking the grim pinnacles the gods had left as a warning. This stage for an age-old pageant is always set. True, the actors of another time have gone, but the crags and cliffs that once

echoed Geronimo's call to battle and to tortures such as the witches never fashioned still are there along the Apache Trail.

This trail to wonderland leads out of Globe, Arizona. You leave the Pullmans of the Southern Pacific Railroad, the smoking obelisks, the copper smelters, and step into luxurious motors that are waiting to take you to this new mirage-veiled country where your picture dreams will all come true. For seventeen miles you see an ever-changing panorama from your soft cushioned seat. The wonderful Arizona sky is above you, while all about are crags, rocks and mighty drops of nature's cliff-made curtains which

seem to forever conceal the mystery of an ancient play.

To the northeast the Apache Mountains round the vast amphitheatre in which once the gods did sit in judgment on the passing show. You are climbing the great divide which separates the Tonto and the Salt River Basins, climbing until a mile above the sea, and then suddenly the reason all bursts in upon you, for far across the purple and golden coloring of an Arizona sun you get your first view of Roosevelt Lake, that pearl-like sea penned in by man and mountain.

There what a lesson in forestry—that lake quenching a thirst that for centuries has cursed the land. Beyond are rainbow-colored hills that have been penciled with crimson, gold and azure by a merciless sun that seemed, day by day through all the centuries, to have laughed piteously at what the gods destroyed. In the descent are seen the cragged homes of the Cliff Dwellers whose civilization had tottered before Cleopatra lured Antony to his doom. That the Cliff Dwellers lived a community life seems certain from an examination of their dwellings. Did they solve this—the question that now puzzles the wisest sociologists in this civilization? Does civilization, like history, repeat itself? Perhaps the delver into antiquity, in these ruins that antedate the Roman Empire, can find the answer to the world-old question that Omar sought to answer.



ONE OF THE LAST MEMBERS OF A VANISHING RACE

The traveler seeks the thing tinged with age. Here then he has it—for on the walls of these dwellings are writings, showing that the inhabitants were highly civilized. Traces of canals for irrigation were to be found showing how the people had fought the battle of life against the odds nature had laid down for the game. These were obliterated when modern man took up the fight in the desert and built the reservoir system now famous around the world.

The drop down the descent of the winding trail brings the thrill akin to days when the old swing started on its downward swoop after you had swung to the height of its reach. You remember the breath catching that came. You get it here from your seat as you lean back and the auto sweeps around prehistoric cliffs over this canyon spanning road, cliff-walled on one side since time eternal and man-walled on the other, that you might see nature's handiwork in comfort. The motor stops and you look and wonder how the Little Men of ancient times managed to get to those homes amid the crags when it has taken the engineering genius of the twentieth century to take you to their base surrounded by the rocking-chair comforts of your home.

As against the prehistoric cliff dwellings, the Roosevelt Dam stands out in bold relief as a link between the centuries now gone and a civilization now dead. This big retaining wall is 1,125 feet long and 380 feet high. It holds back a lake 25 square miles in area. This pile is no less wonderful than the cliff dwellings the traveler has just passed and well may one



THE MASSIVE TIME-SCARRED WALLS OF DEVIL'S CANYON

stand in awe as he sees pictured before him the achievements of the two ages and the two civilizations.

There is pause at the Dam for lunch. Refreshed, one again motors toward the land of Sunset over the second half of the trail that leads to Phoenix and the Southern Pacific's train for Los Angeles and the rose country. One vista after another greets the eye. The well-made road now runs along the side of the sky-scarred cliffs. Through Fish Creek Canyon the motor way is carved on the very face of a cliff.

Up, up, up, there is nothing but rock, while in looking down one sees nothing but the marvelously grotesque

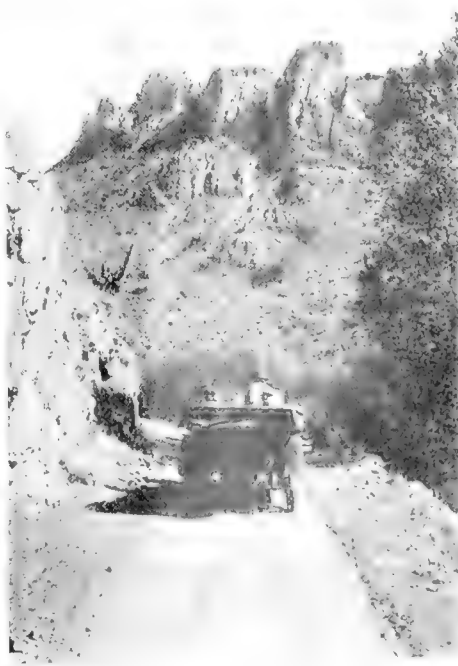
and twisted rocky masses. Next we see old "Arrowhead," sentinel-like, hammered from the solid rock—so runs the Redman's tale—by Chief One-Eye whose ill-shaped form, turned to stone by the wrath of the gods, glares at you farther up the trail. Passing Old Woman's Shoe, Eagle Rock, Whirlpool Rock and the Little Alps we cross Black Canyon and come to Superstition Mountain.

In awe of this the Apache lived; and, as sunset glows about it, the traveler is quite ready to believe the legend of how Chief White Feather and his people were wiped out. White Feather escaped the deluge by scaling this mountain when the waters covered the earth. In prayer, with face upturned to the lightning, the chief held out the precious medicine stone he had carried with him. A bolt struck the stone and White Feather and his followers became pinnacles of rock.

With this age-old legend still fresh in your mind the motor glides into the tree-fringed streets of Phoenix. You step out of legend time and Indian lore into civilization. The comfortable Pullmans of the Sunset Limited are waiting. This trip, a side one, which can be made with convenience only over the Southern Pacific Lines, costs but \$15 in addition to the through fare, and can be made either way—from Phoenix or Globe, depending upon which way you chance to be going. By doing this you have dipped into another world where in ages gone another people sprang up in another civilization, then went their way out where the west begins.



THE HOMES OF A PREHISTORIC RACE

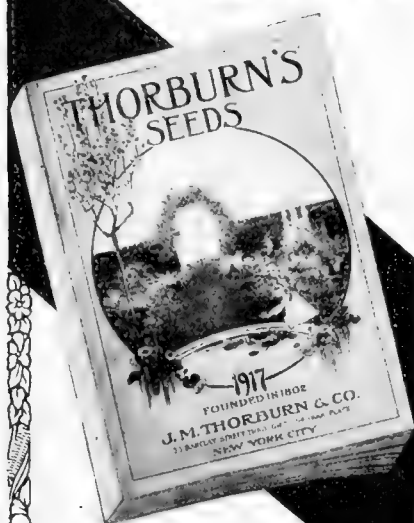


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At the annual meeting of the Canadian Forestry Association in Ottawa on the 15th inst. the following subjects were discussed: "The Peril of the White Pine Blister Rust," speakers, Dr. H. T. Gussow, Dominion Botanist; G. C. Piché, Chief Forester of Quebec; E. J. Zavitz, Chief Forester of Ontario. "Slash Disposal in Commercial Logging Operations as a Fire Preventive Measure," Mr. T. J. Welsh, of Bemidji, Minnesota; R. D. Prettie, Superintendent of Forestry, Canadian Pacific Railway, and Mr. G. A. Gutches, Dominion Forestry Branch, Supervisor for Saskatchewan. "Cutting Regulations on Quebec Crown Lands and their Value in Forest Maintenance," Avila Bedard, F. E. Department of Lands and Forests, Quebec.

"The pine blister disease has not assumed anything like the alarming proportions in Canada that it has in the New England States," stated Clyde Leavitt, Chief Forester, Commission of Conservation of Canada, at The American Forestry Association meeting, Washington, D. C., in January. "The seriousness of the menace is, however," said Mr. Leavitt, "pretty generally recognized, and it is believed that the measures taken and contemplated should enable the authorities to prevent material damage to the extensive white pine forests of the country, which are valued at upwards of \$200,000,000, to say nothing of the potential value of the large areas of young white pine growth in all the provinces of eastern Canada.

"The great bulk of our forest lands are owned and administered by the respective governments. The provinces of Ontario, Quebec and New Brunswick derive a direct revenue, into the Provincial treasuries, of about \$4,000,000 per year, from cutting privileges on these Crown lands. Of this, some \$1,250,000 may be credited to white pine. Thus, it is easy to understand why the governmental agencies should take a very strong and direct interest in preventing the spread of the pine blister disease.

"This disease was first noted in the Fall of 1914, in the Niagara peninsula of southern Ontario. The presumption is that it was brought in on white pine nursery stock imported from Europe between 1906 and 1909. During the two succeeding seasons a number of inspectors have been employed under the direction of E. J. Zavitz, Provincial Forester, in locating infections and eradicating diseased plants, both pines and currants.

"The section where the worst infections have been found is about ten to fifteen miles west of Niagara Falls. Here there is a district comprising some 300 square miles in which there are large numbers of currants and gooseberries. The black currants show more infection than the red. The Niagara peninsula is an old-settled section, with practically no white pine of commercial value, but with many scattered trees of this species in fence corners, lawns

woodlots, etc. The great problem is to prevent the spread of the disease to the commercial white pine region in the more northerly portions of the province. Some outlying infections have been found to the north and west of the Niagara peninsula, but the measures taken to eradicate diseased plants have resulted in keeping such outbreaks under control.

"Under the direction of the Dominion Botanist, Mr. W. A. McCubbin has conducted research work, which promises important results in the development of control measures for this disease.

"In the Province of Quebec, small infections have more recently been found at two points not far from Montreal. The most serious aspect of the situation in this province is the threatened invasion along the International boundary, from northern New Hampshire, Vermont and New York. It is possible that such an invasion may already have taken place, since the U. S. Bureau of Plant Industry last summer discovered an infection in northern Vermont, within a mile and a half of the Quebec boundary. The Provincial Forester, Mr. G. C. Piché, is now planning the organization of a force of inspectors, who will, during 1917, investigate the whole situation fully, with a view to locating existing infections and taking necessary steps for the eradication of the disease.

"It is fully recognized that such action is of the utmost urgency, since the serious spread of the disease in Quebec would threaten the large native pine area up the whole Ottawa valley in both Quebec and Ontario.

"The white pine areas of New Brunswick do not appear to be threatened as yet, but they may become so, unless adequate action is taken to prevent the spread of the infections located last year in the state of Maine.

"The Ontario and Quebec governments both maintain forest nurseries. The movement of white pine stock from both these nurseries has been discontinued, and the planting of white pine is practically at a standstill until it can be determined what will be the outcome of the campaign for the eradication of the pine blister disease. There are no commercial nurseries selling white pine material, so this feature of the situation is under complete control.

"Under Dominion legislation, the further importation of white pines from outside Canada is prohibited. Dominion laws also provide adequate authority for the destruction of diseased plants, whether pines, currants or gooseberries. The Ontario Act is effective along the same lines. Action in Quebec can be taken under the Dominion legislation, pending amendments to the provincial legislation, should such action be found necessary.

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pine, which must be protected against the spread of the blister disease.

"On the whole, the situation in Canada may fairly be said to be well in hand. The Governments of both Ontario and Quebec have given the most definite assurances that all necessary funds will be provided for this work, and the continued co-operation of the Dominion authorities is assured."

Using Cut-over Lands

The lumbermen of a dozen states are to aid in the development of the agricultural resources of the south, through the utilizing of the cut-over lands left after the manufacture of the forests of the south into lumber. How to accomplish this end will be an important part of a conference of representatives of all the southern states from Virginia to Texas, which has been set for March 19 to 22 in New Orleans.

Long Life for Wood

Interesting booklets on "Long Life for Wood" have just been issued by The Barrett Company which has branches all over the world. The booklets deal with farm timber and their preservation and the articles are illustrated from pictures from the U. S. Department of Agriculture and the Associated Mutual Fire Insurance companies. The booklets call attention to

Bulletin No. 387 of the Department of Agriculture for treatment of timber and detailed instructions.

Strengthening Boxes

Tests at the Forest Products Laboratory, at Madison, Wisconsin, indicate that by the use of four additional nails in each end an increase of 300 per cent in the strength of canned-food boxes is secured.

A Forestry Number

The Journal of Agriculture, published by the students of the University of California, devotes the entire November number to forestry and the edition would be a credit to any large publication or publishing house. The articles are contributed by some of the best known men in forestry work and the pictures are well printed.

Pine Blister in Canada

In the January number of the Pulp and Paper Magazine a great deal of space is devoted to the white pine blister disease. In addition to an editorial there is an article by H. T. Gussow, Dominion Botanist of Ottawa, which describes the pest and tells of the importance of checking its spread.

Forestry Club Meeting

At Seattle, March 1, 2 and 3, will be held the annual convention of the Intercollegiate Association of Forestry Clubs. It is

expected that representatives of all the forest schools of the United States will be present. Many side trips to big mills are planned. The officers for the year are Donald H. Clark, president; Timon Torkelson, secretary; Jesmond Balmer, vice-president.

The State College of Washington will inaugurate this year a short course in farm forestry as part of the winter short course of the department of forestry, this new idea in forestry education being the plan of F. G. Miller, in charge of the department. Washington, since starting its work in teaching forestry problems, has been forging ahead rapidly.

Maple Sugar Industry

In coöperation with one of the leading manufacturing companies, The New York State College of Forestry will undertake during the coming spring the study of the maple sugar industry in New York. An experimental orchard will be tapped near the State Ranger School at Wanakena, New York, and among other things to be investigated are the nature of sap flow, character of individual trees giving best yields, cost and efficiency of various types of equipment, and costs of various operations. The results of these studies will be incorporated in a bulletin.

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Reforestation Lands

Approximately 10,390 acres of denuded lands within the National Forests were reforested in the fiscal year 1916. The total number of trees planted was 6,146,637, while 8,280 pounds of tree seed were sown.

National Forest Grazing

There were 133,442 more cattle and horses, and 605,338 more sheep and goats using the National Forests in 1916 than in 1915. This increase was in spite of large eliminations of grazing lands from the Forests. It is accounted for by improved methods of handling the stock and by more intimate knowledge of the forage on the ranges and their carrying capacity.

Decrease in Forest Fires

The number of fires suppressed on National Forest lands during the calendar year 1915 was 6,324, as against 7,018 in 1914, and an average annual number of 4,759 during the past five years, says Henry S. Graves, Chief of the Forest Service, in his annual report just published. While more than the average number of fires occurred the timbered area burned over was but 155,416 acres, or 30 per cent less than the average per year for the period 1911-1915 inclusive. The average loss per fire was \$60.41. Forty-four per cent of the fires were confined to areas of less than one-quarter of an acre.

Forest Fire Losses

It is estimated that in 1915 about 40,000 forest fires occurred in the United States, which burned over about 5,900,000 acres and caused a damage of approximately \$7,000,000.

Our Standing Timber

Revised estimates place the amount of standing merchantable timber in the United States at approximately 2,767 billion board feet. Of this amount 1,464 billion board feet, or 53 per cent of the total, is in California, Washington, Oregon, Idaho, and Montana.

Forest Improvements

During the past fiscal year there were constructed on the National Forests 227 miles of new roads, 1,975 miles of trails, 2,124 miles of telephone line, 89 miles of fire lines, 81 lookout structures, 40 bridges, 222 miles of fence, 545 dwellings, barns and other structures, 17 corrals and 202 water improvements.

Land Elimination

Since the passage in 1912 of the act providing funds for land classification and as a direct result of the classification work, a total of 13,477,781 acres has been eliminated from the National Forests. This includes an elimination of approximately 5,800,000 acres of land from the Chugach National Forest in Alaska which embraced lands of low value for any purpose other than mining.

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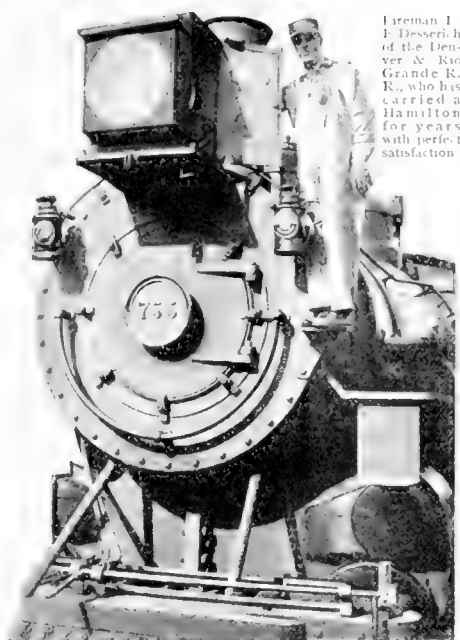
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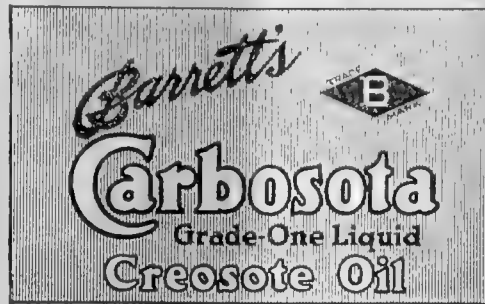
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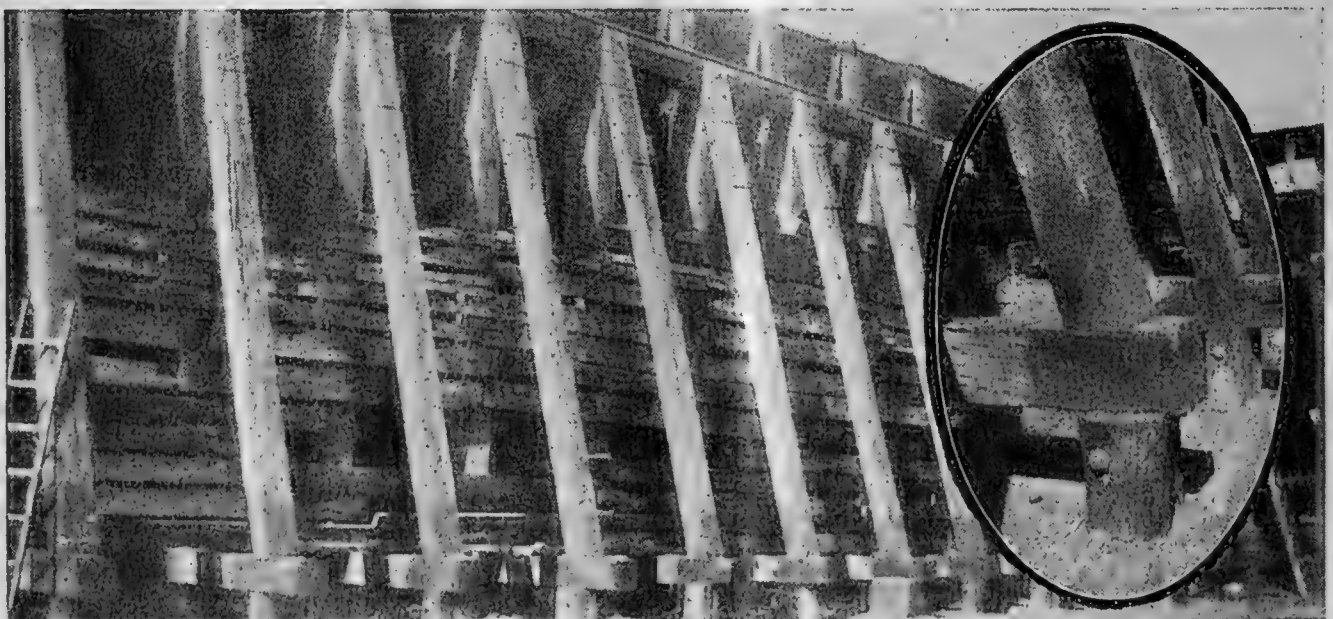
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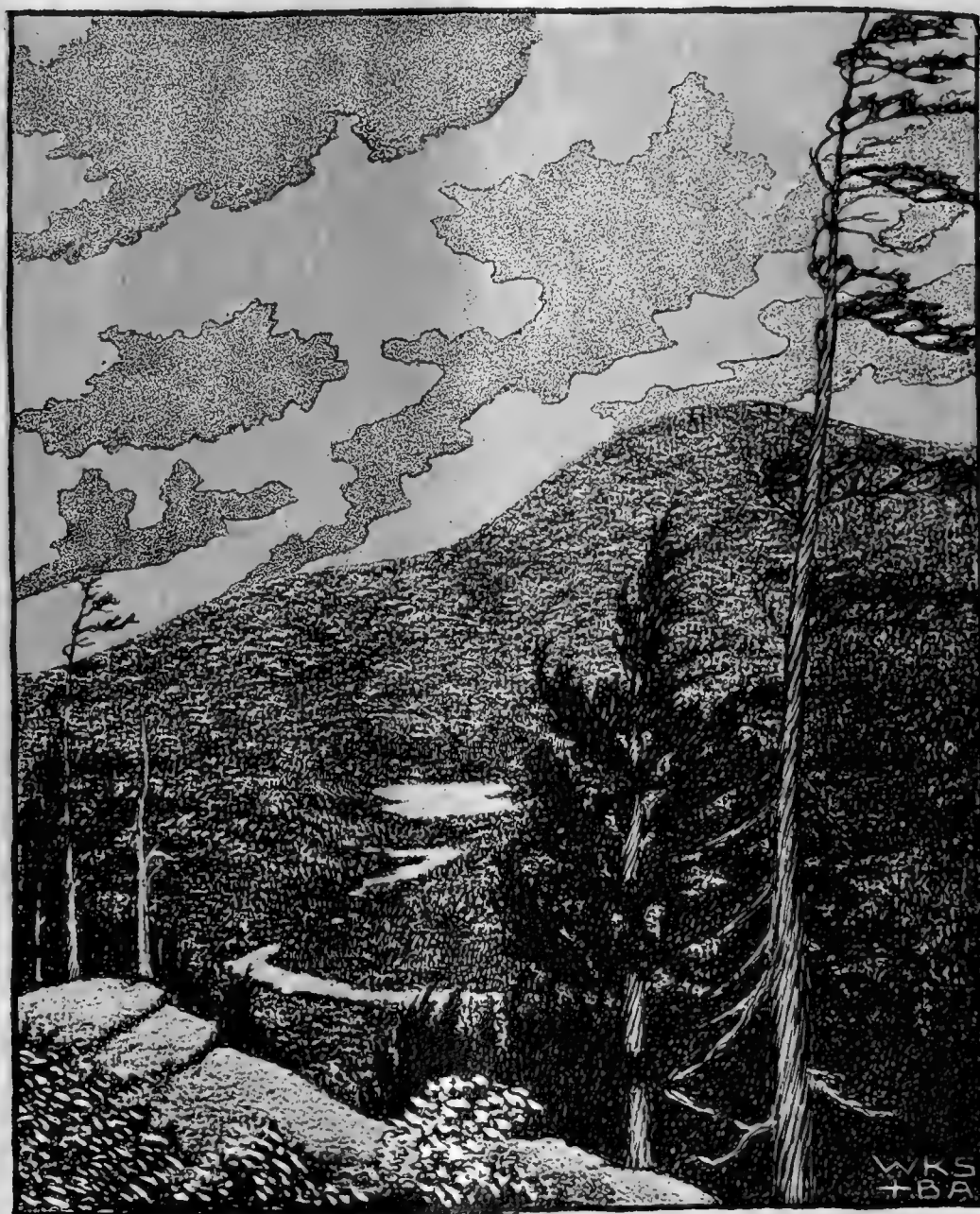
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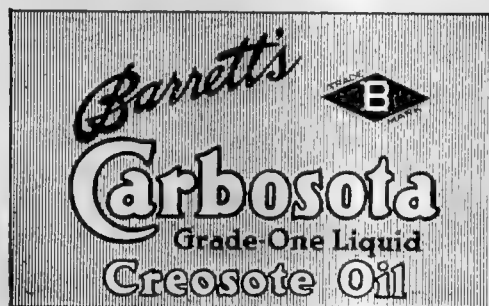
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THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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MARCH 1917 VOL. 23

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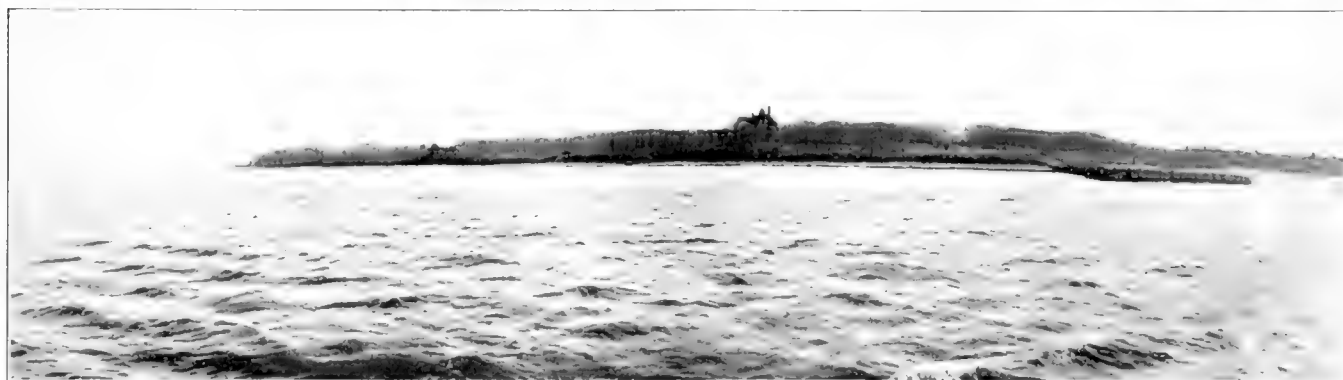
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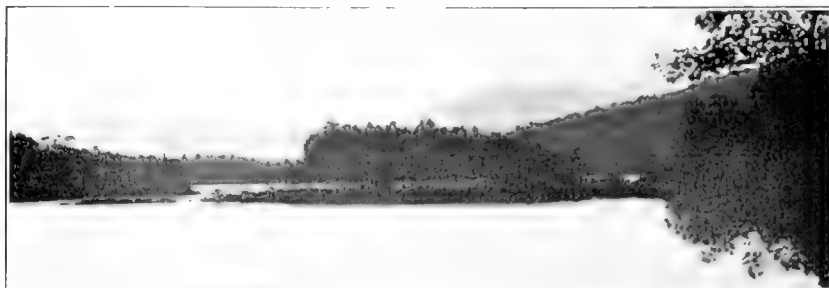
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AMERICAN FORESTRY

VOL. XXIII

MARCH 1917

NO. 279

RECREATIONAL USES OF THE NATIONAL FORESTS

BY HENRY S. GRAVES.

CHIEF FORESTER, U. S. DEPARTMENT OF AGRICULTURE

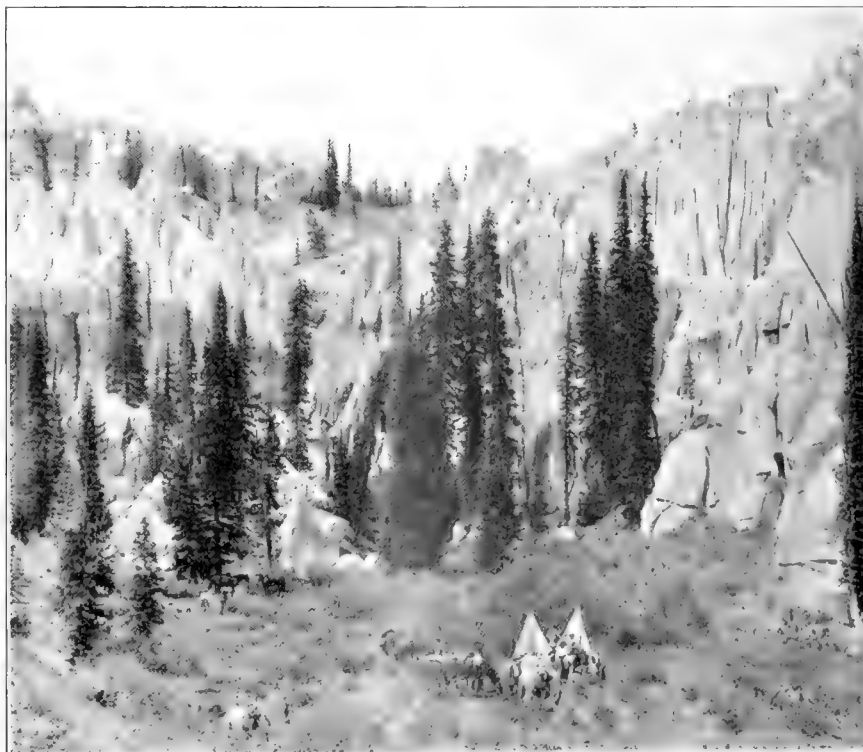
ONE of the important public interests in forest regions is their service for recreation and health. There is a rapidly increasing appreciation of the exceptional recreation resources which we have in this country and which our own people are just beginning to seek out and enjoy. There is also a growing appreciation that, like forestry, these resources will not be safeguarded and rightly developed in the public interests unless the public itself participates in their handling. In the past the wild lands of our upland and mountain regions have been more or less open for camping and hunting. Vast areas have been cut and burned off and their special attractiveness destroyed. As the timber stands become restricted greater care is exercised by the owners in their general use. Many owners fear to have campers on the lands because of the increased danger from fire. Some wish to hold the property exclusively for their own use. Others lease their lands to hunting and fishing clubs. The closing of private tracts is therefore constantly contracting the areas available for public use. How common it is for parties to find spots, where formerly they stopped to camp over night, posted with "Private Land—Keep off." More and more large private preserves are posted with "No Trespass" signs, or the camper is met by a warden who requests him to move on. Local resentment in mountain countries at the closing of one large tract after another to the camping and hunting by the public is not wholly lawless. It is hard to see a few privileged persons control the mountains where formerly free access for recreation was allowed. There is the feeling on the part of the men

who have guided, fished and hunted over these areas that they ought to belong to the whole people in common. And they are right, and if I am not mistaken a large part of these mountain lands will ultimately be publicly owned or controlled. The closing of private lands points to the value of publicly owned forest lands, where people living in urban communities and hot agricultural regions can find an opportunity for the refreshment and recreation that can be secured by a sojourn in the forest. More and more, therefore, the lands owned by the nation, the states, and local communities will have an importance as public playgrounds.

These facts apply with special significance to the National Forests. Located as they are chiefly in the mountain regions, the National Forests comprise many regions of superb scenery and unexcelled recreation attractions. It is not only to the noted mountain sections that I refer, as in the Olympic Mountains, the Cascades, Sierras, the Rocky Mountains, or here in the east in the White Mountains and Southern Appalachians. I have in mind also the lakes, both the larger ones like Chelan, Tahoe, Pend Oreille,

Cœur d'Alene, and the innumerable smaller lakes, the streams abounding in fish, the deep forests, the canyons, superb mesas, and other features that in infinite variety and interest occur throughout these forest regions.

The problem of the recreational use and enjoyment of the public forests is not as some think one of mere sentiment. Of course there is sentiment in the enjoyment of fine scenery, in camping, in sport. Indeed, I feel sorry for the man who has no sentiment about the moun-



ONE OF MANY WONDERS

There are hundreds and hundreds of scenic features in the National Forests. This, the Wheeler National Monument in the Rio Grande National Forest, Colorado, is one of them.

tains and their forest scenery. Neither is it a question of protecting the forests and scenic wonders for a few wealthy persons who can afford to take long trips on the railroad, buy expensive pack outfits, and so on. We have a very practical problem of opening up and making available the public properties for as wide a use as possible by people of little means as well as by those better-to-do.

The possibilities of public benefits of the recreational use of the National Forests and Parks was never better illustrated than during the past summer in Colorado. It was a time of great heat in the agricultural regions of the Plains States. Nearly seven hundred thousand people visited the National Forests of Colorado alone. Trains were crowded and hotels filled to overflowing. But thousands came in their automobiles or other conveyances, from the cities and farms, equipped with tents and cooking outfits, and camped in the Forests a day or two here and there, or often for a longer sojourn near a stream, a lake, mountain meadow, or other attractive spot.

The immediate service of the public forests for recreation is just as conspicuous in other portions of the National Forests. It is a regular thing for the people living in the valleys of California and southern Oregon and elsewhere to take during the hot summer frequent camping trips in the mountains, sometimes for a few days, sometimes for several weeks. Throughout the National Forests are found thousands of such campers, a large majority of whom are local residents from

the valleys below, seeking refreshment from the heat. Some of the Forests already are visited by no less than fifteen to twenty thousand people each year; and I estimate that there are at least one and a half million persons who use the Forests in a single year, chiefly for recreation purposes.

In a very real sense the recreation attractions of the

National Forests constitute a natural resource that must be safeguarded, utilized, and developed. It is a resource of great economic importance to the local communities. By its development every citizen in the locality benefits directly or indirectly. It is not only through the added business in furnishing accommodations, supplies, transportation, and so on, to the tourists, but many persons become regular visitors, often building summer homes and becoming permanently identified with the region. In a multitude of ways the local industries are stimulated.

The recreation features of the National Forests are fostered in a variety of ways. First, by protection from defacement of those sections of special value and interest from a scenic and

recreation standpoint. Systematically such areas, both large and small, are being searched out and designated so that the cutting of timber and other uses may not result in their injury. Such areas include mountain peaks, lakes, canyons of special interest, high mesas, roadways, and so on. In effect these constitute a multitude of parks and parkways within the Forests, to be used especially for recreation purposes.



A SUMMER CAMP IN A CALIFORNIA NATIONAL FOREST

It is a regular thing for the people living in the valleys of California and southern Oregon to take, during the hot summer, frequent camping trips in the National Forests. Some of the Forests are visited by no less than fifteen or twenty thousand people each year.



ON A PACK TRIP IN THE FOREST

These tourists were among the 700,000 who visited the National Forests of Colorado during the summer of 1916. Trains and hotels were overcrowded and thousands traveled in their automobiles, or in wagons or, like these campers in the Uncompahgre National Forest, with pack horses.



BEAUTIFUL VIEW FROM SECTION OF NEW ROAD IN THE ROUTT NATIONAL FOREST

A view from the Rabbit Ears Pass road in the Routt National Forest, built by the Forest Service as part of the road system by which the National Forests are being opened up to pleasure seekers. It is estimated that about one and a half million people used the National Forests last year for recreation purposes.

But protection is only the beginning. The areas must be opened up and made available for use by the public. A few examples will illustrate some of our problems and how we are working them out.

In southern California, lying directly west of the Imperial Valley, rise the Laguna Mountains in the Cleveland National Forest. Those of you who have visited the Imperial Valley know something of the intolerable heat in the summer, situated as it is below the sea level. At times the temperature is said to remain above 110 degrees for eight or ten days and nights at a time. Thousands of people leave the valley in summer. In fact, it is estimated that the aggregate cost of these summer flights amounts for those communities to from one to three million dollars. We are now building a road from the main El Centro-San Diego highway into the mountains, to a very beautiful tract of forest situated at 6000 feet elevation. This road will enable people of the Valley to reach the forest tract in a few hours by automobile. The tract will be developed, in coöperation with the citizens, as a resort, with hotels, summer cottages, tents, and public camping grounds. Many hundreds can be accommodated who now have to travel long distances by rail to secure relief from the heat. It is a real problem of public health. It is also a matter of saving many thousands of dollars to the Valley people. Can any one say that from every standpoint that forest tract is not more valuable for recreation use than to cut into lumber?

A similar situation exists in the Coronado National Forest near Tucson, Arizona. Here the Santa Catalina Mountains rise some 5300 feet above Tucson on the desert, and are clothed with a splendid stand of timber, furnishing a cool and refreshing summer climate. Here the Forest Service has worked out a complete plan of public resort development, including a system of roads and trails, a water supply, sanitary provisions, a telephone system, playgrounds, and park areas for motors. The value of this resort, when completed, to the city of Tucson with its 20,000 or more inhabitants will be appreciated when one considers that during the summer months there is a difference of over 20 degrees in temperature of the mountains as compared to that in the city immediately below. Well-to-do people regularly flock to the California coast at this time; a means for recreation will, by the proposed plan, be afforded to all, and it is expected that 5000 or more would avail themselves of the advantage at the first opportunity.

Still another illustration is the development of the Angeles Forest that comprises the mountain ranges back of Los Angeles. Each year many thousand people visit this Forest for short trips or a night's camping. In addition there are being developed scores of summer communities and permanent camps. The canyons are lined with cottages and camps, and the highland forest areas are attracting people by scores for temporary and permanent summer accommodations. Every new road and

trail built by the Forest Service opens up new recreation sites, which are eagerly sought. It is in this Forest that the city government of Los Angeles, through its Playground Commission, has developed a municipal playground. After a diligent but vain search in the mountains and at the beaches for a suitable place nearer the city, the Commission asked for the setting apart of a suitable tract called the Seeley Flats.

The purpose of the Commission was for the use of the public as a camping and recreation ground for the children of the city, and for other patrons of the municipal playgrounds. The following results were attained during the first year.

Four hundred and twenty-seven children were accommodated on the camping grounds, each one for a period of two weeks. The Commission estimates that next year this number will be from 1200 to 1500.

The charge for each person taken was \$7.50, which included a trip from Los Angeles by electric car for 61 miles, followed by an auto stage ride of 15 miles to the camp, board for two weeks at the camp, and the use of a tent and cot during the stay, with return to Los Angeles by the same route.

After the opening of the schools, the tract was open to the parents of the children on similar terms.

About \$800 was donated to the Commission by various people with which to defray the expenses of such children as did not have the necessary \$7.50.

During the past summer the Commission expended, exclusive of salaries, \$4552 on this playground, providing, among other things, a large outdoor plunge, a building, and a water system. Telephone connection was also maintained with the city. The plans approved for the coming season are quite elaborate; 25 cabins will be constructed during the spring months, a cement plunge will be built, a substantial building with kitchen, store-room, and bedrooms will be constructed, and tennis and croquet courts will be laid out.

The Playground Commissioners have provided three instructors to teach the children all kinds of outdoor games and sports. Two or three evenings each week some prominent man from Los Angeles gives the children a "camp-fire talk." Each morning every boy camper donates an

hour's service for cleaning up the camp and improving the grounds: in fact, everything indicates that most careful arrangements had been made for giving the city children an opportunity for recreation and the enjoyment of nature in the mountains.

A persistent effort had been made by one person to secure control of the tract under the allegation that it was

chiefly valuable for farming. It would have been very profitable for him, as a real estate venture, to sell lots, for there is an active demand for such sites for summer camps. But the Secretary of Agriculture chose to put it to a public use, with the results I have described.

The action of the Playground Commission of Los Angeles has resulted in the starting of other camps of a similar nature. The Pacific Electric Railway, with 5000 employees, has applied for a tract about two miles distant where it proposes to build tent houses, dining-rooms and a store, and will rent these facilities to its employees at cost. The Masonic Lodge is looking for a site for its orphans.

Many cities are spending thousands of dollars for welfare work among children, but are hard put to find adequate playgrounds. The problem has been met in large measure by the Playground Commission of the city of Fresno, California.

This Commission has recently been granted the use of a site of land near Huntington Lake in the Sierra National Forest, and proposes to transport annually 5000 children of the city to this National Forest during the heated months. The children will not only enjoy a unique outing, but, according to the plans of the Commission, will be given instruction in outdoor subjects.

In many cases the development of recreation areas becomes a coöperative enterprise by various public agencies. A conspicuous example is the Columbia Gorge division of the Oregon National Forest. This is located on the Columbia River and borders at many points the Columbia River Highway, which is one of the most famous drives in the world and one of the most attractive scenic features of the West. Certain areas have been permanently set aside in the Forest for protection and development in connection with the Columbia River Highway. The Forest Service has constructed a number of scenic trails like



THIS SHOULD BE FREE TO ALL

The sign on the left-hand wall of the canyon marks a cave on patented land in the Pike National Forest. The public pays twenty-five cents to see it. If it were on Government land the public would pay nothing.

that up to Larch Mountain and up Eagle Creek, and is developing public camping grounds at strategic points. In planning and carrying out this work we have the co-operation of county officials and the citizens of Portland, who are in some cases giving financial aid to various of the projects. The plans are correlated with those of the city and county in the entire Park and parkway enterprise.

A similar plan is being worked out in Denver in connection with development of the Mount Evans region, and with other communities which have direct interests in and adjacent to the Forests.

In the eastern mountains, too, we are fostering the recreational use of the National Forests. For many years the public regarded with increasing interest the efforts of Mr. George W. Vanderbilt to inaugurate a system of forest protection and conservation on Pisgah Forest in North Carolina, and not only that but to protect the natural game resources and to systematically increase them. Mr. Vanderbilt went beyond this. He constructed many miles of highway through the mountains and more than a hundred miles of first-class trails. After 20 years of this sort of care and development, Pisgah Forest passed to the Government and now is the Pisgah National Forest. Already it has been created a national game preserve in addition to being a National Forest, and definite plans are being carried out to maintain the great beauty of the mountain landscape, to develop the land to highest timber productiveness, and to further increase the fish and game resources. Under a plan of coöperation between the Biological Sur-

vey, the city of Asheville, and Buncombe County in which it is situated, the American Bison Society, and others, a plan is being worked out by which the elk and buffalo will be re-established on this Forest in large enclosures. It will be the purpose of the Government as

far as its resources will permit to maintain and improve the roads and trails and in every way to increase the attractiveness of the Forest.

In the White Mountains the public has an interest developed through many years of constantly increasing use. The point has been reached where hundreds of thousands frequent these mountains both in summer and in winter and find in them unsurpassed conditions for enjoyment and recreation. The state of New Hampshire has co-operated in providing five automobile highways leading through the mountains and various outing organi-

zations have as a result of many years' enthusiastic work constructed hundreds of miles of trails which are freely opened to the tramping public. Specific plans are being worked out by which the Forest Service will encourage still further the development of facilities for the recreational service of this wonderful region to the public.

The use of the Forests for recreation has been fostered by the fact that term leases may be secured for periods up to 30 years for the construction of hotels,

for summer cottages, and similar purposes. Many are already taking advantage of this opportunity to establish a summer home in the Forests; of special importance is it to secure a systematic development of hotels, rest houses, and other accommodations to visitors. Sites are being



A NATIONAL FOREST LODGE

A type of small summer resort that is becoming popular in the National Forests. It is meant especially for transient guests.



From Biological Survey.

A PARADISE FOR SPORTSMEN

Good fishing can be had in most National Forest streams and lakes. Here at Lake Margarete on the Routt National Forest is found some of the best. Year by year the number of men who flock to such places on the National Forests is increasing by thousands.

leased and developed for this purpose in a plan-wise fashion, public camp grounds are being improved by the Forest Service, maps and circulars are furnished to visitors, and all are given a cordial and coöperative welcome to use the public facilities.

A rapid development for recreation is following the building of roads and trails that has for its purpose the general opening up of different parts of the Forests. Already there have been built about 25,000 miles of trails and some 3000 miles of roads. Most of the trail work has been done for fire protection or general communication. But many of the trails pass through sections of surpassing scenic interest.

At the last session of Congress there was appropriated a special fund of ten million dollars to be available at the rate of a million a year, which, added to the quarter of a million now annually available from the receipts of the Forests, will result in opening up many regions now inaccessible. While the selection of the roads may be primarily for general development purposes, nearly every new road will greatly add to the recreational use and development of the Forests.

Of great importance as a recreational feature to attract the visitor is the wild life of the National Forests. Through the help of the Bureau of Fisheries and the state hatcheries a great deal is being done to maintain the fish in the numerous mountain streams, and with excellent results. The game problem is a more difficult one. The game is far less than should now be produced in the Forests. Restricted authority has prevented the Government doing what is obviously desirable and necessary in order to restock depleted areas. There is still, however, a good deal of game at certain points, and I hope that it may be possible to secure authority to go forward with the plans which have already been formulated to increase the game supply. Of special interest are the elk herds in the Yellowstone region and the Olympics, and the remarkable moose of the Kenai Division of the Chugach Forest in Alaska. Other elk herds occur in Montana, Colorado, and Arizona. Small bands of sheep range the rugged portions of many of the Forests, and in some places they are increasing under prohibition of hunting; and at numerous points deer and other game are still fairly plentiful. But we hope that the opportunity may be given us to take the steps necessary to restock the depleted areas that could carry abundant game (and that is possible

without interfering with the livestock industry), so that practically all the Forests will produce both big and small game. These would be an added resource valuable in itself, and a special attraction to the visitor, to the real sportsman and to the increasing number that now hunt with the camera.

In considering the recreational features of a large for-

est tract one is apt to think first of the points of special scenic interest, such as lakes, mountain peaks, a certain bit of forest, and so on. Of course such areas will be central points of attraction and perhaps visited more than any other portions of the Forest. At the same time every portion of a public Forest furnishes some recreational feature which must be considered in a broad plan of recreational development. As



BOY SCOUTS IN THE NATIONAL FOREST

In such regions the boys find everything needed to amuse and interest those who love the outdoors, and in camps and traveling they acquire much-needed instruction regarding nature.

soon as the visitor enters a Forest he encounters some activity of interest from the public standpoint. It may be the protective system, with its roads and trails, telephones, lookouts, tool and food caches, etc.; or nurseries, or plantations; or timber sales in actual operation; or mines; or water-power development. The Forest system is a great public enterprise, and the visitor is almost invariably interested in seeing how the Forest activities are being conducted and what public results are being secured.

In working out the recreational development there are involved many technical problems. In our road building we have the service of the engineers of the Office of Public Roads. In the game problems, the Biological Survey experts are available for advice and assistance. Problems of landscape and sanitary engineering present themselves in large numbers, and we have associated with us a distinguished landscape engineer to guide our work, each step in which counts large and must be taken right.

An important aspect is the correlation of the work on the several Forests with that of the National Parks, which in many cases are surrounded by National Forests or are adjacent to them. We seek to coördinate the Forest road and trail systems with those in the Parks. The systems of scenic highways should be comprehensive in character. They should comprise the National Parks, the scenic points in the National Forests, and the scenic points in the forest and park systems of states and municipalities, and even those privately owned. It is all a part of the broad policy of making the public recreation resources of real service to the people. The returns of such service are very real and greater than can be measured.

CONSERVATION OF GAME IN THE NATIONAL FORESTS AND NATIONAL PARKS

BY E. W. NELSON.
CHIEF, BUREAU BIOLOGICAL SURVEY

LONG after the increasing population of the eastern United States had forced the elk and the bison across the Mississippi, the boundless open plains and forested mountains of the West swarmed with a primeval abundance of game. All are familiar with accounts of the millions of bison, antelope, elk and deer which ranged the great plains and the Rocky Mountain region within half a century, and a writer traveling through the San Joaquin Valley, California, in 1850, records seeing "bands of elk, deer and antelope in such numbers they actually darkened the plains for miles and looked in the distance like great herds of cattle."

The resistless westward advance of settlement continued and now the agricultural lands from the Atlantic to the Pacific are peopled, and where crops cannot be grown the watering places are held for the use of multiplying

game refuges exist, the Grand Canyon and the Wichita, where game is protected under Federal law. In addition, state game refuges have been made on the National Forests in six states. On these state refuges, as elsewhere on the National Forests, state game laws prevail, though the authority of the Federal Government controls the timber and grazing.

In the sixteen National Parks the Federal Government has full authority to protect game in only seven: the Yellowstone, Glacier, Mount Rainier, Crater Lake, Platte, Hot Springs, and the Hawaiian. The states have not ceded jurisdiction for the other nine parks and in the absence of Federal legislation the Federal authorities can punish poachers there only by expelling them from within the park limits. Of the 34 National Monuments, 21 are administered by the National Park Service, 11 by the



From Biological Survey.

BISON ON THE FEDERAL BISON RANGE AT DIXON, MONTANA

Within the memory of many now alive there were hundreds of thousands of buffalo in the West, but their indiscriminate slaughter for beef and hides has resulted in their almost complete disappearance.

herds of cattle and sheep. Under these conditions not less than 90 per cent of all the big game remaining between the Mississippi Valley and the Pacific Coast has been forced to retreat to the mountains traversing that vast region. There among the rugged peaks and forest-covered slopes which characterize our remaining wilderness are sheltered the survivors of the wonderful hosts of big game animals which once graced so large a part of the continent. Fortunately the major part of these mountain lands, not being available for agriculture, have remained, and are likely to continue, a part of the public domain.

At present the situation as to game control in the West is extremely chaotic. The game there is practically all concentrated on that part of the public domain included in the National Forests, National Parks and National Monuments. On the National Forests two Federal

Forest Service, and two are under the jurisdiction of the War Department, but the game on them remains subject to state jurisdiction.

To add to the confusion, the states have many varying and conflicting laws which often produce unhappy consequences for the game. Furthermore, in many of the states where the laws appear to give a fair degree of protection, through lack of funds, or for other reasons the protection is extremely ineffective. The fact that game is steadily decreasing in a large part of the West while the number of sportsmen is increasing is indicated by the fact that in the regulations under the state laws there is from year to year a decrease in the number of game animals a hunter is permitted to shoot in a season.

Throughout the West where elk, antelope and mountain sheep were once so plentiful and widely distributed,

elk may be legally shot in three states only; mountain sheep in two, and the hunting of antelope is generally prohibited. In five states west of the Mississippi River deer hunting is entirely prohibited; in eight the limit is one deer to the hunter a year; in five states the limit is two deer; in two states three deer, and in Louisiana the limit is five.

In Arizona, one of the last states where frontier conditions prevailed and in which there is a great extent of superbly forested mountains and plateaus, affording ideal conditions for game, the native elk was exter-

National Parks by rangers of the National Park Service of the Department of the Interior. For some years the Forest Service has been making a careful survey of game conditions in National Forests and is well informed as to the existing situation. It is well for the remaining wild life of the West that the men in charge of both forests and parks are deeply interested in its conservation.

It is evident that wild game inhabiting a National Forest is as much a natural asset of the forest as the annual crop of grazing or of the timber. Up to the present time our attitude has been that it is something entirely apart and subject to entirely separate control. This has been unfortunate for the game. With the example before us of the efficiency shown by the Forest Service in safeguarding from spoliation and making useful to the public the resources of grazing and timber in its custody, it is



Photograph by Albert Schlechten.

MULE DEER IN YELLOWSTONE PARK

Intelligent protection and restocking of ranges may restore these deer in large numbers. Colorado has successfully reintroduced elk and has largely increased the almost exterminated mountain sheep.

minated nearly twenty years ago, the antelope and mountain sheep are so nearly gone that there is a permanent close season on them, and there is a bag limit of one deer a year to the hunter.

The idea of game conservation in the West extends back less than 30 years, and there, as in most comparatively new regions, many people long retain the feeling that wild game belongs to whoever can take it, a survival of the point of view of more primitive times. It has been the history of all new regions that the pioneers depend on game as a source of food supply and kill it freely at all seasons. No thought is given the future until, with the increase of population, the number of animals killed so far exceeds the natural increase that the supply is rapidly destroyed. It is evident from what we know of past and existing conditions in a large part of the West that, although the sentiment for protection is increasing, game will continue to disappear unless some wiser and more effective method than now exists is put into operation, not only for its protection, but for its perpetuation and increase.

The National Forests are patrolled by rangers of the Forest Service of the Department of Agriculture, and the



Photograph by Albert Schlechten.

WHITE-TAILED DEER IN YELLOWSTONE PARK

In five states west of the Mississippi River deer hunting is entirely prohibited; in eight the limit is one deer to a hunter a year; in five states the limit is two deer; in two states it is three and in Louisiana it is five.

evident that if it were given guardianship over the game on the forests the results would be of far-reaching importance. The trained corps of forest rangers and guards can and do now serve with practically no extra cost as wardens over the game, and a practical constructive program could be developed, not only for conserving the game, but for restoring it to areas where it has disappeared, and in increasing the supply to the full capacity of the available summer and winter grazing. The control of the grazing of cattle and sheep on the National Forests being in the Forest Service, gives that organization the absolutely essential knowledge of summer and winter grazing conditions that is required if the game is to be safeguarded. The use of the forests for domestic stock will continue on a great scale, but with good management great numbers of game animals may exist in the same forests.

In a program for rehabilitating the game resources of the National Forests, where there is abundant room for an enormous number of game animals without seriously interfering with the present livestock industry, three things are essential:

(1) A series of national game preserves located in favorable situations and distributed in National Forests throughout the West in order to provide breeding sanctuaries where game may increase and supply the surrounding areas.

(2) Coöperation between the Forest Service and the states wherein National Forests are located, whereby the Forest Service shall designate the parts of the forests

park there is a superabundance of summer grazing where several times the present number of elk can find abundant forage for all time to come. The high altitude of the park and the severity of the winters there are such that winter grazing is limited, particularly in severe weather, necessitating that a large proportion of the elk pass outside the limits to secure sufficient forage. The park is surrounded on all sides by National Forests on which the forester is authorized to grant grazing permits for livestock. The increasing settlement of the West and the growing demand for grazing permits indicate that within a comparatively short time there will be a call for every acre of grazing



Photograph by Leel.

HOW SHALL THESE ELK BE FED IN WINTER?

The Forest Service and the National Park Service are now making a census of the elk in the Yellowstone Park with a view to providing winter feed for them when the grazing on which they have been depending in the winter is so depleted that it can no longer maintain them. This photograph was taken in early winter at Jackson Hole, Wyoming.

where hunting may be done and the number of animals that may be killed in any particular forest or section of forest each season, the states meanwhile to have full control over issuing hunting licenses and to receive all fees therefrom. The states would thus benefit by the services of the trained force of forest rangers and guardians acting as Federal game wardens to guard the game resources from spoliation just as they now protect the trees and the grazing in the interest of the country at large.

(3) A coöperative arrangement between the Forest Service and the National Park Service whereby the game service in the National Parks and the National Monuments shall be coördinated with that of the Forest Service to the same end, that the game supply may be increased and perpetuated.

The necessity for this mutual coöperation is evidenced in the elk situation in the Yellowstone Park. Within the

available up to the very limits of the park. Should permits to this extent be granted and the range stocked to its full capacity the areas now available to elk for winter grazing would be eliminated. As a result of this only one or two severe winters would be sufficient to decimate the Yellowstone elk herds. The Forest Service has wisely foreseen the approach of this danger and for several years has been planning to safeguard the future of the elk in this area by reserving a sufficient area for their winter grazing. In order to do this intelligently, however, it is necessary to know the number of elk in the park and the location of the ranges to which they naturally drift in winter. Several counts of the elk herds in the Yellowstone have been made, and an arrangement effected whereby the Forest Service and the National Park Service will make a joint census this month, when the elk are on their winter range, the park and forest rangers

working under the direction of a representative of the Boone and Crockett Club.

With information concerning the winter location of the herds and the number of animals thus made available it will be a comparatively simple matter to delimit the necessary winter range for the elk and reserve it for the use of the elk herds. The elk herd which spends its summer along the southern border of the Yellowstone Park and descends in winter into the Jackson Hole region, is now carried through the stress of severe winter storms by being fed hay on the Jackson Hole winter refuge, which has been purchased by the government in order to care for these animals. This refuge is in charge of the Biological Survey, which has a resident warden there who, each summer, superintends the putting up of more than 600 tons of hay. The available lands on the refuge may be planted and made to yield approximately double this amount of hay when it becomes necessary.

The refuge and feeding station in Jackson Hole is located on the ancient wintering grounds of thousands of elk and has been necessitated by the influx of settlers who have taken up a large part of the former wintering ground of the elk for farming and stock raising purposes. The available summer grazing for this herd, which numbers over 20,000 animals, is abundant.

In order to carry out the conservation program for game on National Forests outlined above it will be necessary to secure Congressional action to set aside game refuges on the forests.

As soon as the plans suggested above are well understood, the states will no doubt join in coöperation to secure the benefits which would flow to them from such an arrangement. They would thereby secure the protection and increase of their game resources with no added cost to themselves and with no added burden of wardenship. By this arrangement the rights of the states to legislate for the hunting of its game, making seasons, licenses and other essential features would still remain with them; the only check would be to prevent the waste of their game resources.

With the series of game refuges and control of the game on the forests as outlined above it will be a comparatively simple matter to restock or breed up game on nearly all of the National Forests to a reasonable abundance. Deer, elk, and possibly mountain sheep, may be

restored to the point where excellent hunting may again be obtained, although, of course, never on so large a scale as was possible in the early days. Experiments in restocking ranges have already been made on a sufficient scale to show how simply and easily this may be done under proper conditions.

A herd of about 70 elk introduced a few years ago from the Yellowstone Park to the Sitgreaves Forest in Arizona has thrived amazingly and in a few years will undoubtedly restock a large area in that region. In Colorado elk have been successfully reintroduced, and, under stringent protection due to local sentiment, mountain sheep which once were on the verge of extermination have bred up in considerable numbers.

A few years ago Alaska contained some of the finest hunting grounds in the world. The giant moose with the noblest antlers of any of the living deer kind existed in astonishing abundance. The snowy white mountain sheep, noted for its gracefully formed horns, was extremely numerous in many places, and caribou of several races roamed the tundras and scanty interior forests in countless numbers. During the last 15 years all have tremendously decreased, mainly through over-shooting to supply the miners' camps and for dog food. Now the Federal Government is building a railroad from the south coast into the interior to develop the resources of that territory, but the thousands of men employed in its construction have created a demand for meat which is threatening the annihilation of the superb game animals of a belt more than 150 miles broad right through the finest remaining game country; thus at the outset the railroad may become responsible for the destruction of one of Alaska's most valuable resources.

In an effort to stay this ill-judged slaughter the Secretary of Agriculture, under authority vested in him, has issued a regulation prohibiting the sale of game killed on the Kenai Peninsula and adjacent region, but the proximity of the new road to this splendid game field and the number of possible hunters make the outlook there dark for the many moose and mountain sheep.

National Forests in Alaska cover not only the Kenai Peninsula, but also the heavily wooded islands along the south coast, where the Sitka deer lives in great abundance and has been killed in large numbers for commercial purposes. In all this region occur representatives of the huge brown and northern grizzly bears, the largest living carnivores of the world.



From Biological Survey.

STARVING ELK AT JACKSON HOLE, WYOMING
Before the Federal winter refuge was established by the Government, hundreds of elk died because they were not able to obtain food. The photograph is of a victim of starvation and a survivor.



From Biological Survey.

FEEDING ELK IN WINTER AT JACKSON HOLE, WYOMING

This winter refuge for elk is now owned by the government. Hay is grown in the summer and some 600 tons are stacked for the winter use of the 20,000 elk in the herd.

In addition to the game the National Forests also shelter another natural asset in the fur-bearing animals such as the beaver, mink, marten, fisher, wolverine and fox, which under proper protection will continue indefinitely to yield a yearly revenue, but which will be completely destroyed if neglected. Beaver are already gone from most of their former haunts, but can be readily restored on many forests. The other species named are becoming steadily less numerous. It would appear reasonable that the same authority covering the game animals should cover the fur-bearers.

For several years efforts have been made to secure authorization from Congress to establish a chain of game refuges on the National Forests as mentioned above. A bill now before Congress provides for the creation of a system of Federal game refuges on the National Forests in all



ALASKAN WHITE MOUNTAIN SHEEP

The opening up of Alaska, particularly now that a railroad is being constructed, will naturally, as it makes travel more convenient, result in increased hunting of the fine game there. There should be proper protection for the mountain sheep as well as the other game.

parts of the West. Unfortunately this bill has been amended so as to destroy its effectiveness, and apparently it will require further time and effort in order to secure this most desirable and necessary legislation, if our game is to be properly safeguarded.

But for the creation of the Yellowstone National Park and the guardianship assumed by the Federal Government over its wild life, there is no reason to doubt that the two great elk herds now centering there, and containing some 40,000 of these splendid animals, would to a great extent have shared the fate of their kind elsewhere. This is true despite the fact that about one-half of these animals only touch the southern part of the park in summer, and winter outside it. Their fate would probably have been no happier than that of the Colorado herds without the protection and moral influence

exerted by the preservation of the animals in the park and the constant increment to their number from that source. In addition the usefulness of this park to the game supply of the country is well shown in the fact that during the last five years over 1700 elk have been shipped from there and from Jackson Hole for restocking the ranges in 20 states, which were formerly the home of elk but where they had been nearly or quite exterminated.



From Biological Survey.

ANTELOPE IN THE WIND CAVE NATIONAL GAME PRESERVE

This is at Hot Springs, South Dakota, and there should be many more like it. The hunting of antelope in the United States is now generally prohibited.

In addition to its notable service in saving the elk, the Yellowstone Park has protected in its native home the last small herd of buffalo that has continued to exist in its original home in the United States.

Another most interesting and valuable result of the protection of game in the Yellowstone has been the preservation from destruction of a moose peculiar to that region. These moose once occupied a considerable area, but the survivors are now reduced to about 1500 in the park and a much smaller number in the immediately adjacent country on the south. There are also within the park limits several hundred antelope and mountain sheep.

With its thousands of herbivorous mammals, the Yellowstone contains wolves, mountain lions, black and grizzly bears, animals among the most notable and interesting of American large game. This park, with its wealth of wild life, has been a wonderful object lesson in game preservation which, as a precedent, has had a powerful influence in encouraging the setting aside of other wild life sanctuaries, both Federal and state.

The interest of the visitors to the Yellowstone in its game animals evidences the strength of the attraction

which wild life has for all. Despite the scenic beauties and natural wonders of this park, the presence of thousands of game animals in their native haunts is widely advertised as one of its most notable features. There is scarcely a well-informed man, woman or child in this country who does not know something of the Yellowstone bears and their free and easy manners.

Glacier National Park is also a game sanctuary where, under government protection, elk, mountain sheep and mountain goats add greatly to the interest excited by the grandeur of the scenery.

For many years there was no Federal law protecting game in the Yellowstone until, in 1894, a poacher wantonly killed a number of buffalo for trophies. This outrage resulted in the prompt passage by Congress of the necessary law, since which time the park herds have been safer from lawless hunters.

It is hoped that in the near future California will cede jurisdiction over the National Parks within her boundaries and thus enable the Interior Department to exercise complete guardianship over the game in Yosemite and Sequoia National Parks. While the variety and abundance of large animal life there can never equal that in the Yellowstone, at the same time



From Biological Survey.

ROCKY MOUNTAIN SHEEP IN YELLOWSTONE NATIONAL PARK

If there is a series of game refuges and proper control of the game it will be a simple matter to restock or breed up game on the National Forests to a reasonable abundance, so that excellent hunting of even such species as the Rocky Mountain sheep may be obtained.

the numerous black bears and deer which frequent the wooded lower slopes, and the mountain sheep peculiar to the high Sierras, will add the finishing touches to the marvels of this wonderful area of tremendous mountain peaks, rushing torrents and magnificent forests.

An Act creating the Mount McKinley National Park,

in Alaska, has recently been passed by Congress. This establishes one of the finest and most needed game preserves on the continent and provides protection for a large number of mountain sheep, moose, and caribou in one of the greatest game districts of the world. The government railroad which is being built from the coast to the interior of Alaska passes near, and unless the park had been created by the present Congress there was extreme danger that hunters for the railroad camps would exterminate the game in this section.

Considering the interest in this magnificent mountain, the greatest in North America, the extermination of the superb game animals about its basal slopes and immediately outlying mountains would not only be a calamity but would discredit us to those who come after. It is most gratifying to learn that local sentiment in Alaska is strongly favorable to the creation of this splendid National Park and game refuge, even many of the market hunters

having expressed their approval. With the increase of population in Alaska, game conditions there are in specially critical condition since the severe climate renders it nearly or quite impossible to restock its game fields once the game is exterminated.

The National Monuments contain many game animals under state jurisdiction. The two most notable of these are the Olympic Monument in Washington, which includes the Olympic Mountains and a few thousand of the Olympic elk, the main survivors of this elk which is peculiar to the humid forests of the Northwest coast region and was once widely distributed therein, and the Grand Canyon Monument, taking in a part of the Grand Canyon of the Colorado and including most of the surviving mountain sheep of that region.

Game is not only an asset of great value from its return in food and skins, but its recreational value in attracting people to the wilderness has long been recognized. The value of game from the latter viewpoint will become increasingly great as the country becomes more

densely populated. A host of men and women each year go to the woods for varying periods for the purpose of renewing their mental and physical vigor, and to a great number of these the wild life is the magnet which draws them. It is impossible to estimate the tremendous return which is derived in this way from the presence of wild life in our forests.

In this connection it is interesting to note the changes which have occurred in man's attitude and relation to wild animals. In primitive times his interest was that of a hunter towards his prey. As he developed, his whole existence for untold ages was interwoven with and largely dependent upon that of the wild life about him.

To study the ways



From Biological Survey.

THE GREAT ALASKAN MOOSE

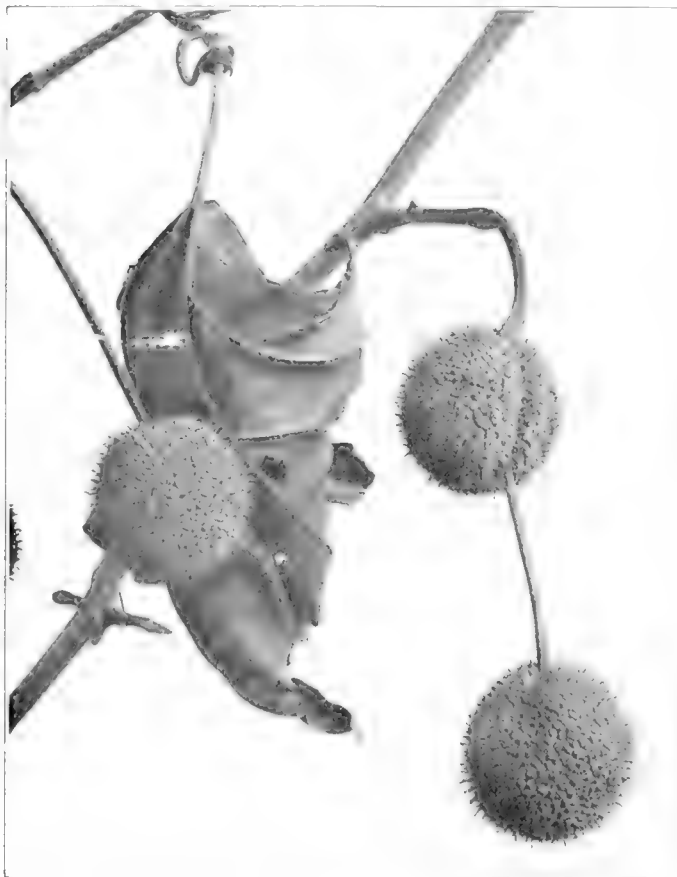
These fine animals with the noblest antlers of any of the living deer kind in the world formerly existed in astonishing abundance in Alaska, but now are steadily decreasing in number, and with the opening of railroads will, unless protected, be practically exterminated.

of the beasts and qualify himself for their capture was his chief safeguard against starvation. A vague feeling of fellowship led primitive man to endow wild animals with mysterious powers and out of his relation with them grew up his mythology, traces of which still survive in our folk tales. But the day of the hunter has in large degree passed and we are now developing a deeper and kindlier sympathy with these habitants of the wilds and welcome their presence as the living expression of the spirit of the wilderness. This sympathetic pleasure in the presence of wild animals in the forest is shared alike by men, women and children, by those who hunt with the gun or camera and equally by a multitude of others, who find some of the most exquisite joys of life in the forest and in the study of its shy habitants.

SYCAMORE OR BUTTONWOOD TREE FLOWER!

By Dr. R. W. Shufeldt

OUR buttonwood or buttonball tree is also widely known as the sycamore, and in the eastern parts of the United States it is a familiar shade-tree in nearly all cities and towns. Tournefort, the distinguished French botanist, gave it its generic name, calling it *Plantanus* from a Greek word meaning broad, he being impressed



THE FLOWER OF THE SYCAMORE TREE

Rare condition of the flower-heads of the sycamore tree, *Plantanus occidentalis*.

with either the breadth of its shade, or with its broad leaf. Its specific name is *occidentalis*, which was bestowed upon it by Linnæus. There is still another vernacular name for it—the plane tree. It ranges from Maine to northern Vermont, thence westward to Minnesota and Ontario, and southward to Kansas. Magnificent examples of it occur in the valley of the Mississippi and elsewhere in the mid-United States; in fact, it is the largest and tallest tree in the forests of the Atlantic tier of states. Sycamores on some of the western rivers attain the height of nearly 140 feet, while those a hundred feet high were not at all uncommon. As these immense trees age, their trunks become hollow, forming fine homes for squirrels and bees.

The familiar flower-heads of this tree are subspherical balls of about an inch in diameter. These are green in fall and summer, but turn a darkish-tan in winter, at which season they form very striking objects in the leafless trees, each ball being suspended by a long peduncle from the twig supporting it. In big trees as many as five or six hundred of these balls may swing there nearly all winter. As a rule, these flexible peduncles bear but a

single button or ball at the free end; but in extremely rare instances there may be two, as shown in my reproduced photograph illustrating this article. When I was a small boy I discovered one of these abnormalities, and I never forgot it. Many a time since I have peered up into sycamore or plane trees in the hope of discovering a second example; but all to no purpose. Among the unnumbered thousands I have seen of them since that day, I have never discovered another like the one I collected over half a century ago in southern Connecticut.

During the latter part of November, 1916, my wife, while walking alone near the National Zoological Park in Washington, observed one of these two-ball abnormalities on a medium-sized sycamore; next day I secured the specimen and photographed it natural size. It will be seen that the peduncle of the upper ball is not more than half the usual length, while that of the lower one is somewhat longer, though not as long as in the case of the normal ones on the same tree. Its proximal end appears as though it were sunk into the side of the upper ball; but whether the peduncles are continuous or not I am not prepared to say, as I have not broken up the upper ball in that I might ascertain the fact. In all probability they are continuous; but it would destroy the specimen to thus investigate the structure.

In some instances the tendrils of a grape-vine had twisted about the stems of some of the leaves of the tree, holding them fast so they could not fall to the ground when all the others did. A case of this kind is also shown in the illustration. The dilated base of the petiole is seen just above where the tendril of the vine has seized the stem, and on the twig of the tree above it is also seen next season's bud, which was covered by the aforesaid dilated petiole, where the leaf grew in position on the twig. This peculiarity is rare among trees.

MICHIGAN TO PLANT 4500 ACRES ANNUALLY

BY asking the Legislature to increase its annual appropriation to \$150,000, the Public Domain Commission is preparing to carry into effect one of the largest forest conservation or tree planting plans which has ever been tried in this country. The plan has the backing of the members of the Commission and is also approved by the forestry experts at the University of Michigan and the Michigan Forestry Association. The state now owns, in round numbers, 540,000 acres of land. It is proposed to plant trees at the rate of 4500 acres per annum and, in what is known as a period of rotation, consisting of 60 years, all of 270,000 acres can be planted. One-half of the other 270,000 acres will in the next 30 years, under protection, produce sufficient material, which by cutting will clear a gross revenue of \$15 per acre. Beginning with 1947 it is thought advisable, according to the plan, to cut at the rate of 4500 acres per annum and plant at the same rate with the more valuable pines. By 1977 the remaining 135,000 acres will be treated in a like manner, so that the initial restocking of all forest lands will have been completed in 2007.

SAVE US FROM INVADING PESTS

BY J. G. SANDERS, *
ECONOMIC ZOOLOGIST OF PENNSYLVANIA

THE majority of our citizens should be so well informed regarding the pernicious practices which now obtain in the United States, whereby an open door is maintained for the introduction of immense quantities of infested and infected plant material, that argument for the limitation of this evil would be unnecessary. But I have eminent reasons to believe that not all who are interested in the promotion and maintenance of agricultural and horticultural health have fully sensed the present

These foregoing statements are preliminary to a recital of needed forms of defense against enemies of plants, which are threatening the food product possibilities of our

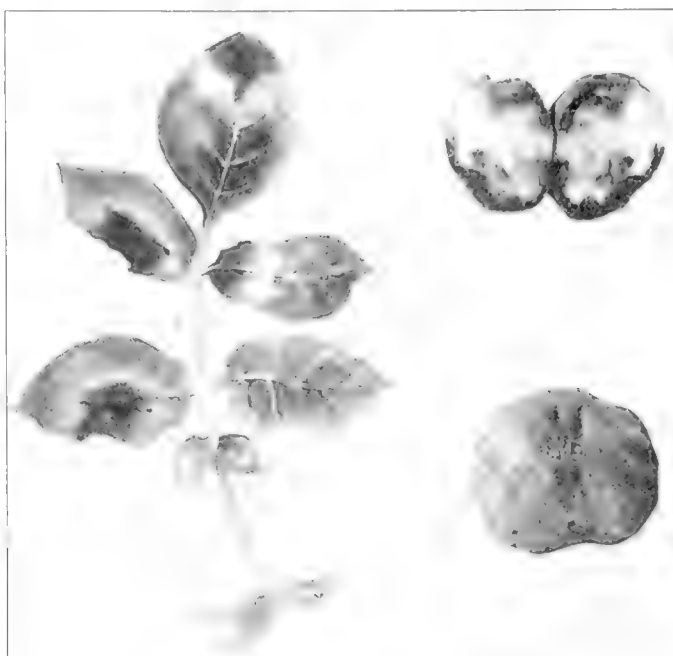


AVOCADO WEEVIL

The Avocado Weevil seriously injures Avocado seed in Mexico and Central America and has been frequently detected in seed from these regions. To protect the Avocado interests the Federal Horticultural Board has quarantined all seed from Mexico and Central America.

pitiful condition of these interests in our country, nor do I think all of us realize the many dangers which threaten our welfare with every shipload of foreign plants discharged on our shores.

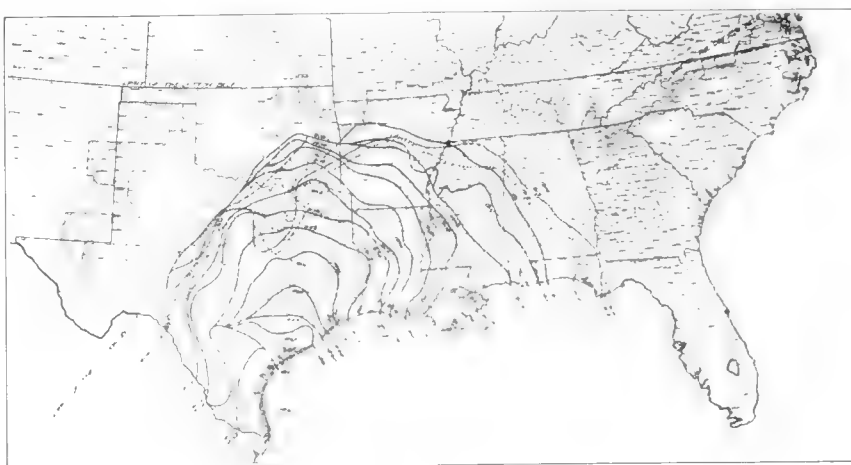
If every teacher and student of the practical sciences, and every member of our many agricultural experiment stations were fully cognizant of the history of plant pest introduction into America, and of the untold millions lost annually through their ravages, it would seem that sufficient publicity could be given the facts to awaken careless America to remedial action. I have used the expression "careless America" advisedly yet truthfully. We Americans are subjects of derision by foreign nations, on account of carelessness in many phases of our national and economic life. Our coasts are inadequately guarded from human invasion, aided by powerful machines of war, and there is but little doubt that charts and plans of many of our coast defenses, and full reports of our vulnerable seacoast are reposing in the vaults of foreign nations.



LATE BLIGHT OF THE POTATO ON THE LEAVES AND THE TUBER ROT WHICH FOLLOWS IT

This is one of the most serious of all potato diseases. It is almost constantly present in the humid North of both Europe and America and was the direct cause of the famous Irish famine. The disease is readily controlled by Bordeaux mixture.

country, just as surely as similar enemies in the past have entered and attacked our agriculture and horticulture, destroying each year several times the total annual appropriations for our army and navy. As the speed of ocean travel lessens the transportation period and increases the frequency and facility of shipments from abroad we cannot expect a diminution of the danger of plant pest



SPREAD OF THE BOLL WEEVIL

The lines show the progress year by year of the boll weevil which has already done millions of dollars' damage to cotton.

introduction in the future. Our judgment from past experiences warns us of even greater evils to come.

Unwise persons have asserted that soon we will have imported all the pests which threaten us, and this danger will have passed. Impossible! No one cognizant of the multitudes of dangerous insects and plant diseases through-



LOOSE SMUT OF WHEAT

A wide-spread though generally much less destructive smut than bunt. It causes an estimated annual loss of \$7,735,000 to farmers of the United States. It can be prevented by hot water treatment. Infection occurs at flowering time.

out the world as yet unreported in this country would accept an hypothesis. Just as a wise physician can diagnose a dangerous disease in its incipient stage, or can foresee an epidemic, if quarantine regulations were abandoned or unenforced, so can a plant physician and entomologist foresee calamity to agriculture in its various branches, when precautions are ignored, and dangerous pests permitted entry and establishment.

Unknown dangers lurk in every shipment of plants to America from foreign lands. Even though it might be humanly possible to inspect them for known foreign pests, certain insects and diseases which may be insignificant in their original native surroundings, when introduced into new territory without their natural enemies and checks, and, perchance, finding new and more pleasing host plants, will multiply with startling rapidity, and soon become destructive pests. The chestnut blight, white pine blister

disease, the citrus canker, cotton boll weevil and San José scale are notable examples of development under these circumstances. Every plant-feeding insect has the inherent valency of a destructive pest.

Nature conserves the balance, which too frequently is disturbed by commerce and agricultural practices of civilized men. The pristine condition of America from an agricultural standpoint was ideal for the production of amazing crops at low cost, on account of the paucity of destructive insects and plant diseases. Could our plants and seeds have been introduced without the attendant diseases and insects, we might to-day have been growing potatoes free from late blight and rot, powdery



BUNT OR STINKING SMUT OF WHEAT

This is controllable by seed treatment. It causes an annual loss of \$54,000,000 to farmers of the United States. A wide-spread disease spread by planting smutty seed and in some sections by winds and smutty heads left in harvested fields. Crushed smut balls smell like decaying fish.

scab and scurf, and there would have been no necessity for the autumn reduction of the midsummer estimates of the potato crop by our Federal Agricultural Department by millions of bushels, occasioned by uncontrolled ravages of the late blight and rot in 1916. The potato, like certain other of our agricultural products, was introduced from abroad, and in the absence of the introduced pests and diseases our crops would be fully returned.

Since the organization of the Federal Horticultural Board, and the subsequent inspection of imported plant

material, 508 distinct species of insects, and 189 distinct plant diseases have been intercepted on plant imports from abroad. It is safe to presume that a considerable number of these would have developed to the stage of serious and destructive pests, if we may judge from performances of similar introductions in the past. By no means, however, has our inspection been able to prevent the introduction and establishment of numerous insects

Among the many plant diseases which have probably been introduced, and are now demanding serious consideration are the asparagus rust, alfalfa leaf spot, bean



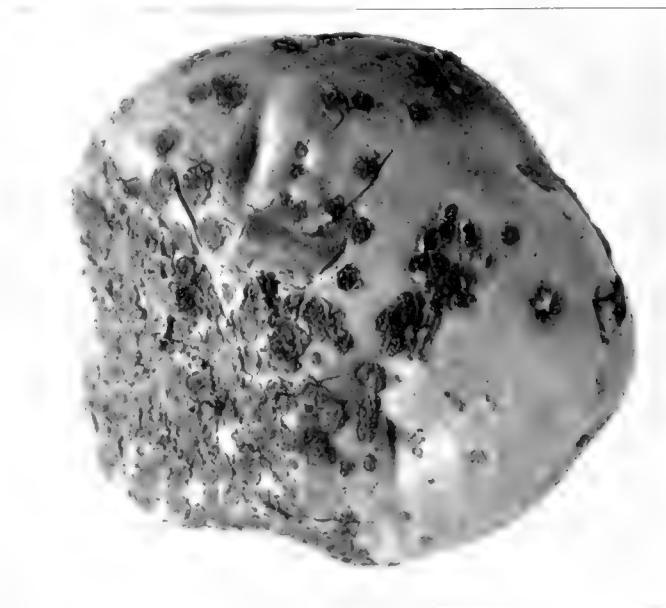
BARLEY INFECTED WITH DISEASE

(a) A sound head of barley.
(b) Two heads affected with covered smut, an easily prevented disease which causes an estimated annual loss of \$2,100,000.
(c) Three heads affected with loose smut, a disease preventable by hot water treatment. Causes annual loss of \$1,225,000 to the farmers of this country.

and diseases, some of which may even now be established and are rapidly multiplying, but as yet have not attracted the attention of the scientists.

A list of the introduced insect pests and plant diseases, which have become established in this country, would be too extensive and lengthy for consideration at this time, but I will enumerate a number of the more important ones, and I am sure that you will recognize a large number of those pests which we consider of prime importance in America.

It is my rather hasty determination that approximately 75 per cent of the major insect pests and plant diseases of the United States have been introduced from abroad. Surely some of the most destructive ones are in this category.

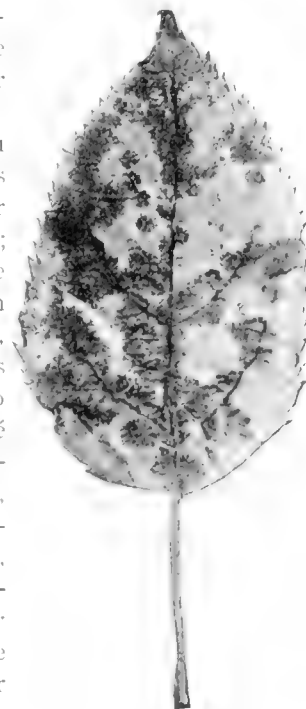


POTATO POWDERY SCAB

A disease probably originating in South America, carried from there to Europe, and thence to Canada and the United States—at one time the cause of serious alarm and a temporary quarantine. It has fortunately turned out to be a disease of cool, moist climates, and unable to spread in most parts of this country.

anthracnose and rust, European apple canker, apple scab, pear scab, brown rot of various fruits, the downy mildew of cruciferous plants, the chrysanthemum rust, chestnut blight, diseases of cotton, carnation rust, the hyacinth disease, the hollyhock rust, the loose smut of oats, the olive knot disease, the peach leaf curl and peach scab, ergot affecting rye and allied cereals, violet rust, loose smut and rust of wheat and other grains. Also, those recently introduced diseases, the white pine blistercanker, the citrus canker and the poplar disease.

In this list those of you familiar with plant diseases have noted a large number of our serious plant pests; those more familiar with the insect pests will recognize, in the few which I have listed, some of the most serious creatures ever introduced into this country—the San José scale, the fluted scale of citrus, the oyster-shell scale, black scale, red scale of California, red scale of Florida, European fruit scale, European fruit lecanium, cottony maple scale and the tulip tree scale, as well as many other scale insects which are pests in greenhouses throughout the country, the codling moth,



APPLE SCAB

This scab affects the leaves as well as the fruit and reduces greatly the food-making surface of the tree.

Hessian fly, anguino grain moth, the hop plant louse, cabbage worm, several species of weevils affecting peas and beans, three species of domesticated cockroaches, bulb mites, narcissus bulb fly, the elm leaf beetle, gypsy moth, brown-tail moth, leopard moth, cotton boll weevil, the alfalfa weevil and Argentine ant. In this list we find some of our most expensive and costly importa-

lieve that a final adjustment of these lines cannot be effected within a very short time, so that we will not be dependent on other countries for our horticultural products.

Statements have been made by our nurserymen that it is impossible to grow in America plants of such superior quality as are now produced abroad and shipped to this country. This is a debatable question, and will remain

so until absolutely serious efforts have been made in America to produce these desired products. The placing of an embargo on the import of horticultural products would ultimately benefit the nurserymen, florists and horticulturists of this country, by eliminating those pests which are gradually being introduced into this country, and just as surely, after due time and opportunity, are injuring all demand for certain kinds of nursery and florists' stock. As an instance, no one in the region now infected with chestnut blight will buy or plant chestnut nursery stock. If the citrus canker should escape control in Florida and ruin the citrus industry, the nurserymen growing citrus stock would have to seek other business. If the white pine blister canker escapes and destroys our white pine as rapidly as it is planted, there will be no demand for nursery stock of this type. Similar examples might be cited in other lines, if so desired.

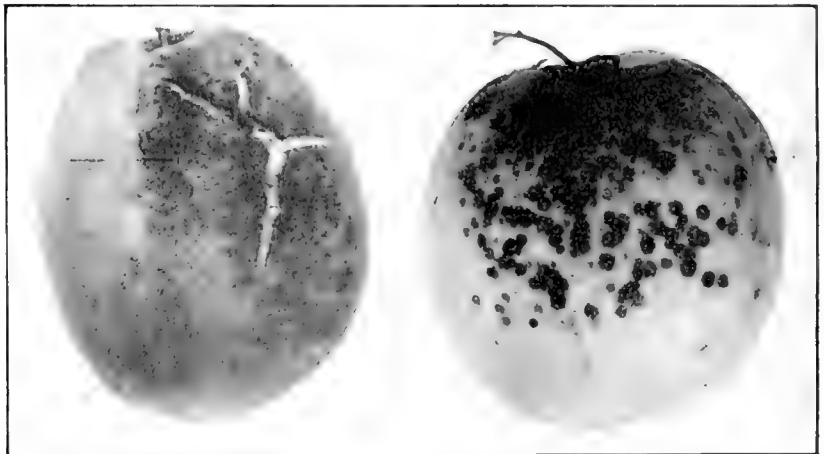


BROWN ROT OF THE PEACH

This is a serious disease in the peach growing section of the eastern United States. It may even render worthless the fruit while it is in transit to market.

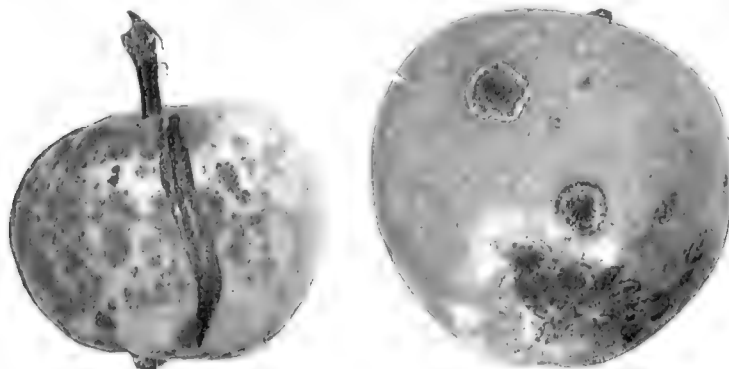
tions; but by no means have we introduced all which may come to our shores—for there await introduction large numbers of species of insects and diseases, which are known to be pests in foreign countries, and might possibly be much more serious if introduced to America.

The question which arises in our minds is a preventive for this amazing and startling condition of affairs, and there seems to be but one method whereby we may eliminate further danger absolutely, and that is by a Federal embargo on the further importation of plants and plant products from abroad. The imposition at once of such an embargo would for a time handicap the nurserymen, florists and seedsmen of this country, but there is no reason to be-



PEACH SCAB

This causes an average loss of 10 per cent of the total value of the peach crop of the eastern United States.

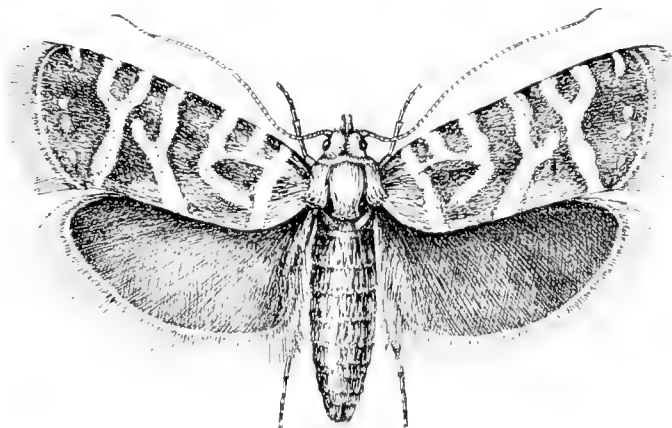


APPLE SCAB

This is the most destructive disease to which this fruit is subject. In unsprayed orchards, it may destroy the whole crop. The total expenditure for spraying in the United States because of this disease is enormous.

The possibility of a Federal embargo being placed on the importation of nursery stock has aroused some of our nurserymen and florists considerably, and they have maintained that an "absolute embargo" would almost ruin their business. Certain of the farseeing, and I may say better informed nurserymen, realize that something must be done to protect their interests from the ravages of pests, and after two or three informal talks with various groups of nurserymen, I am pleased to report that in most cases these men are willing to forego the importation of certain classes of what may be termed "finished nursery products," feeling that they wish to continue the importation of seedling stock for propagation in this country. In

one informal conference with some nurserymen, in which this problem was discussed, there was evidenced the feeling that nurserymen generally would be fairly well satisfied if all "finished nursery stock," including all plants with balls of earth about their roots, were pro-



EUROPEAN PINE SHOOT MOTH

This pest has in recent years been introduced into America on imported pine seedlings and is now established in widely separated localities in the eastern and middle western states.

hibited, and permission given to import (1) fruit tree seedlings; (2) 2-year seedlings, cuttings, buds or grafts of ornamental shrubs; (3) deciduous shade, ornamental and forest trees not to exceed six feet; (4) coniferous evergreen stock not to exceed eighteen inches, except 5-leafed pines, which are prohibited. If a proposition of this sort were maintained and an embargo arranged accordingly, I fully believe that 75 per cent of the present amount of inspection would be eliminated, and, furthermore, this arrangement would eliminate the importation



TWISTED GROWTH OF EUROPEAN PINES

This is a characteristic injury caused by the larvæ of the European pine shoot moth.

of some plants, most dangerous on account of the impossibility of inspecting them thoroughly.

After giving this problem much thought and consideration I feel that I could recommend, without too much injury to the importing nurserymen, an embargo



WORK OF THE EUROPEAN PINE SHOOT MOTH

Showing the fall injury to pine buds by young larvæ of the moth. Many buds are thus destroyed, as in America the larvæ have developed the habit of eating out from two to four buds before winter.



ANOTHER FORM OF INJURY

This malformation caused by the larvæ of the European pine shoot moth is so familiar in European pine forests that it has a popular name in each country, as "posthorn" and "waldhorn" in Germany and Holland and "baionnette" in France.

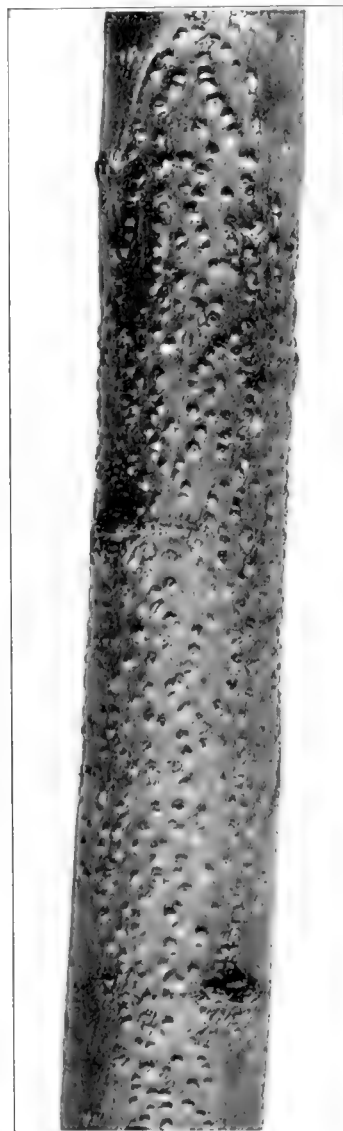
on all importations of plants with earth about the roots, to be enacted as soon as possible, and that a three-year period be allowed for the importation of the classes of nursery stock outlined above, after which all further importations should be prohibited, except importations by the United States Department of Agriculture of such nursery stock as is deemed desirable by said department—this to be grown and propagated under quarantine for a reasonable period before distribution. This proposition doubtless, even though quite lenient, will be opposed strongly by many importers, but the question to be considered is whether we shall continue to permit the importation of a few thousand dollars' worth of plants, any shipment of which may bring in a dangerous pest, which ultimately may cost the country millions every year.

Is it not appalling, in consideration of the long list of imported pests now established in this country, when we learn that \$14,293,500 has been spent in New England by Massachusetts and other infested states, with the Federal Government assisting, to prevent the spread of

the gypsy moth? These figures do not take into account the immense damage to forests, woodlands, private and public premises, nor the amounts of money spent privately for control of this pest. It would be absurd to attempt an approximate estimate of the total cost and losses entailed in this country by the introduction of the San José scale about 1870. The futility of attempts on a large scale to control an insect pest or a disease, which has once gained a firm foothold in this country, is apparent, for in no case have any such attempts succeeded in this country, nor will they ever succeed under the present system of government, unless very broad, comprehensive power is given to some official board. Our experiences of the past show that the actions taken for control are usually several years behind the advance of the pest.

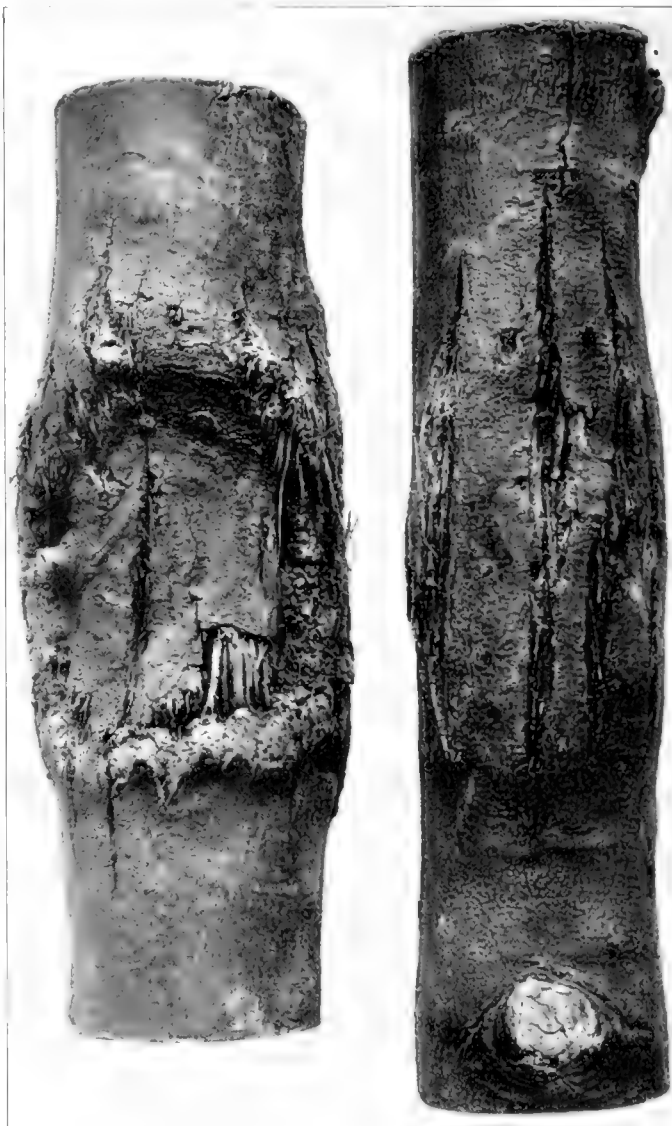
The establishment of an embargo on "finished plant products" would place in the hands of our legitimate nurserymen and growers the very business

in which they are concerned, and would eliminate the present baneful system whereby nursery stock of doubtful origin, variety and quality is sold by brokers, dealers and commission houses everywhere. Much of this stock is shipped to this country to be sold on consignment or at auction, and it is oftentimes of such poor quality that it



EUROPEAN POPLAR CANKER

This disease, recently imported from Europe, is doing serious damage to the poplar trees of the eastern section of this country and is spreading westward.



CHESTNUT BLIGHT CANKERS ON AMERICAN CHESTNUT

This disease has practically exterminated the chestnut trees of this country and has caused losses of millions despite efforts to save the trees.

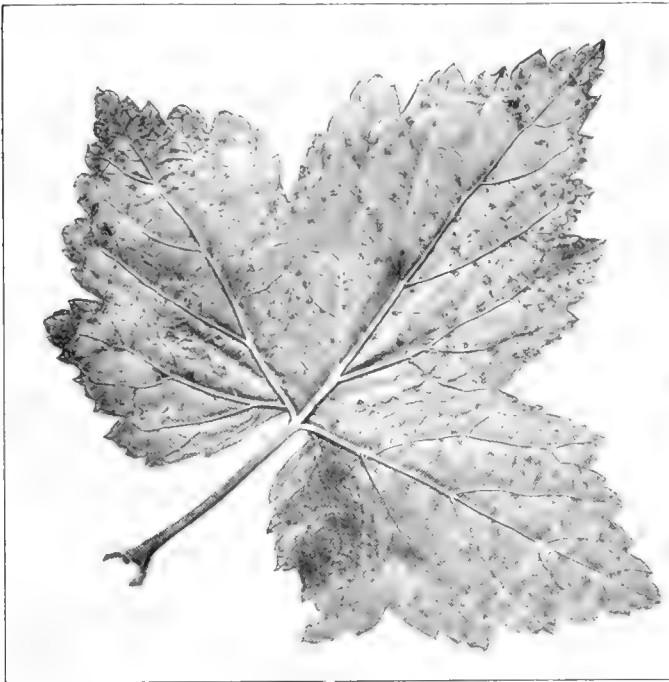
should have been placed on the brush pile in foreign countries. The nurserymen of this country have done little to protect themselves against this practice, but as a matter of fact the step has been taken for them by an agreement recently signed by all but five of the growers and exporters in Holland, binding them to prevent further shipment of nursery stock for sale at auction in this country.

Adam Smith in his valuable treatise, "The Wealth of Nations," says, "By restraining, either by high duties or by absolute prohibitions, the importation of such goods from foreign countries as can be produced at home, the monopoly of the home market is more or less secured to the domestic industry employed in producing them."

Destruction of the nursery and florist's business would not follow the adoption of a limited embargo as out-

lined above, to be succeeded after a short period by an absolute embargo.

Years ago Germany, France, Austria-Hungary, Holland, Switzerland and Turkey prohibited absolutely all entries of nursery stock from the United States. These countries took this step after one severe lesson, viz., the



Photograph by R. K. Beattie.

INFECTED BLACK CURRANT LEAF

The white pine blister disease propagates on currant and gooseberry leaves and then spreads to the trees. This black currant leaf is lightly infected. The orange pustules show as dark spots in the photograph.

introduction of the grape phylloxera from America which ruined their vineyards, but we have had numerous severe lessons in the United States and no adequate measure for protection has been adopted and enforced. Had the United States Government taken similar action, even at that time, this country would now be free from the brown-tail moth, leopard moth, citrus canker, chestnut blight, white pine blister canker, alfalfa weevil and many lesser pests introduced since that time.

Only this year we are informed that an extremely dangerous borer of the twigs of peach, apricot, cherry and plum trees has been introduced into the District of

Columbia, presumably from Japan, and having multiplied enormously, has spread for miles around, injuring about 90 per cent of these trees in its path. At this time it promises to be one of the most serious fruit pests ever introduced in this country.

Under the present conditions of inadequate and nearly futile inspection, the importation of pests will be a continuous performance. It is beyond human ability of the most expert kind to inspect plant imports with absolute certainty, and past experience has shown the weakness and failure of our present system. More stringent methods



Photograph by T. J. Horton.

WHITE PINE BLISTER DISEASE

Showing the open blisters on the bark of a young white pine from Wisconsin. This is an introduced disease which is extremely destructive to white pine (five-needled pines). In some cases 100 per cent of the trees in a given stand have been found to be infected.

must be adopted. I firmly believe that there reposes in the educated men of this country a sacred trust that they shall pass on to the next generation the best possible conditions for the promotion of agriculture, horticulture, forestry and public health.

FLATHEADED BORERS ON FOREST TREES

FLATHEADED borers are among the most important of the borers infesting forest trees in the United States. Some mine the leaves, one burrows into the cones, a number bore into the inner bark and outer wood of the trunk, branches, and roots, while the majority excavate oval winding "wormholes" throughout the sound or decaying sapwood and heartwood.

The bark-borers often girdle and kill healthy trees or those injured by fire, floods, droughts, diseases, other insects, or careless lumbering, and at other times weaken trees so that they become easy victims of diseases, other insects, or unfavorable environment. Sometimes when

they do not kill the tree outright their work causes dead limbs or twigs, or serious defects, checks, or gum spots to form in the wood, or swollen galls to form on the branches. The wood-borers mine the sapwood and heartwood of the trunk, top, and larger branches and thus destroy or seriously injure a large amount of the tree's most valuable product, its timber. Wormholes will cause the finest grade clear lumber to become unfit for the higher grade uses and therefore unsalable at the higher prices.

SEE SPECIAL OFFER TO MEMBERS, UNDER
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BIRDS AND THE CAMERA

BY A. A. ALLEN, Ph.D.,

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

AS the present wide-spread knowledge of birds has grown and the study of the living creature has superseded the study of the dried museum specimen, nothing has done more to attract public notice or to maintain and increase interest than has bird photography. With the use of the camera in recording the habits of birds and bringing graphically before the world, not only the birds themselves but their interesting ways and their work



THE FIRST SWIMMING LESSON

The camera gives us glimpses of the intimate life of birds that few persons would have the time or patience to seek out for themselves. The newly hatched Pied-billed Grebe is taking its first swim.

in destroying injurious insects, it is little wonder that thousands of persons have awakened to an appreciation which formerly was impossible. By means of the photographic plate, the lantern slide, and the half-tone reproduction, one is now permitted to see glimpses of birdland that most people have neither the time nor the patience to hunt out for themselves. The photograph and the motion picture now bring to all nature lovers the exultant sensations which before were the special privilege of the naturalist when, after hours of exertion, he at last succeeded in lifting the curtain, exposing for a moment the intimate life of the wild bird.

But the naturalist still gets his reward through sensations a hundred times more poignant than the feelings of those who merely view his pictures, and for this reason: the number of naturalist photographers is ever increasing. With the greater number of photographers and the advance in photographic equipment, standards of photography have been greatly raised, so that to-day the perfect photograph is not only a portrait of the bird, photographically correct and artistically arranged, but it is the one which also depicts more fully and more accurately than any pen picture ever could some incident in the bird's life. Such a picture has scientific value. It is more than a photograph, it is more than a portrait, it is a fact permanently expressed in the most accurate manner possible.

It is quite possible to convey an erroneous impression of a bird by means of the camera either because of the bird's fear or merely because of the limitations of the lens and the fore-shortening that often appears when objects are photographed at close range. To be of the greatest value, the photograph must show the bird in a natural and characteristic pose; it must show the bird's characteristic markings, and the bird must be doing some characteristic thing. The photograph must express the bird to the very best advantage. Unfortunately a relatively small percentage of the bird photographs taken come up to this standard and are perfect in every respect. Even of those



SNAPPED WITHOUT THEIR KNOWLEDGE

A feeding station for photographing birds near a window. The camera is concealed beneath the box at the right and focused on the branch where one sees the chickadee.

taken by expert bird photographers, the majority are faulty, for there are so many difficulties to combat.

First, there is the finding of the nest or the feeding place suitable for photographing, within reach of the camera and in sufficient light unspotted by shadows; then the bird must be tamed or accustomed to the blind and camera; the weather must be favorable with sun but no wind; the bird must come within the much-restricted focus of the camera; and when all these difficulties are surmounted, the photographer must wait until the bird assumes some characteristic pose before making the exposure. Then if the bird is not alarmed by the click of the shutter a good picture will result—provided of course there are no mechanical defects in the camera, shutter, plate holder, or plates and that development is performed correctly. If

all the conditions are perfect and one uses keen judgment as to the exact instant when the exposures are made, and if he is lucky, one plate out of three should yield a perfect picture. Taking wind and weather as they come and nests in all varieties of locations, one can count himself fortunate if he secures one perfect picture out of thirty exposures. This does not apply to feeding station pictures where conditions are much simpler and more easily controlled and where a far greater percentage of perfect pictures can be expected. As it is the object of this article to show how bird photography is done, rather than to depict its difficulties, in order that those who are interested may secure another resource for their leisure hours, we might well begin with this simplest form of bird photography.

The feeding station.—We will assume that birds have been attracted to a feeding log according to the explanations in the December issue of *AMERICAN FORESTRY* for 1915 and that a number of birds are coming regularly to be fed, either near a window or to a spot in the woods. It is then time to arrange the perch upon which the birds are to be photographed, for in taking bird portraits one soon learns that the field of the camera is extremely small and the focal range very limited. The camera must be focused on a narrowly delimited area and the birds must come to exactly that spot, for a fraction of an inch difference will often ruin the picture. When ready to take the photograph all other food should be removed or covered so as to increase the chances of the bird's coming to the exact spot. It always takes birds some time to get used to a camera, so a box should be kept where the camera is to be placed for several days previously. In fact it is well, instead of using a tripod, to drive a post in the ground as in the accompanying illustration of a photographic station near a window and keep a box permanently in position where the camera can be concealed. When all is in readiness, a thread or a long rubber tube is stretched from the shutter to the window or hiding place and one waits for the bird to come. Even more convenient than the thread or long tube is a device made from the electro-magnet of a doorbell, which, by the use of a couple of dry cells, can be made to trip the shutter even more successfully than the thread.



LESSON IN NEST PHOTOGRAPHY

The floating nest and environs of the pied-billed grebe. In photographing birds' nests one should try to show as much of the environment as possible without making the nest too small.

The camera.—For this type of photography almost any kind of a camera will do—even a kodak with a portrait lens attachment and with no focusing device can be used because the distance from the lens to the spot where the bird will be can easily be measured. The best camera for bird photography, however, is one that has a ground glass for focusing and has a bellows length of at least fourteen inches (preferably more) so that a portrait attachment will be unnecessary. A 4 x 5 size will prove most convenient for all-around work.

The lens.—The longer the focal length of the lens, the better, because it permits one to use the camera at a greater distance, and even when this does not seem necessary it is an advantage because even the tamest birds will jump at the click of the shutter and when the camera is farther away, the sound is not so audible. Telephoto lenses, however, are unserviceable for most bird work because they require too much care when focusing and too much time when exposing. The more expensive anastigmat lenses are the most satisfactory because they permit of shorter exposures, thus decreasing the chances of the bird's moving, and permit of taking pictures on days when the sun is not shining. Any lens, however, is satisfactory when the light is good.

The shutter.—For feeding station pictures and most other work, the ordinary lens shutter working at one-fifth, one-twenty-fifth, and one-fiftieth of a second is satisfactory, although the shutter that makes the least noise is the best. Multi-speed and focal plane shutters which are necessary for flight pictures requiring an exposure of not more than one-eighth-hundredth of a second are not necessary here.

The exposure.—In photographing birds or other objects at close range, about double the exposure required for landscape work is necessary. Thus in bright sunlight the correct exposure with the diaphragm at F. 11 or U. S. 8 would be one-twenty-fifth of a second. Birds which jump at the click of the shutter show movement in a one-twenty-fifth second exposure, so it is better to open the diaphragm to F. 8 or U. S. 4 and give one-fiftieth of a second exposure. On dull days the exposure must be lengthened as in other photography and many of the negatives will be ruined by the movement of the bird.

The plate. Whether plates or films are used is a matter largely of personal preference, although most naturalists prefer plates. For snapshot pictures the more rapid the plates the better, as they will permit of shorter exposures. The above exposure was given for the ordinary plate such as Seed 27, the speed of which is xl. Seed 30. Graplex, or Lumière plates would permit shorter exposures. For time exposures slower plates are better, double-coated plates giving a wider range of exposure and being more dependable.



UNCONSCIOUS OF THE SHUTTER

A chickadee portrait taken as shown in the preceding photograph. He looks as if he was posing and was proud of the fact, but he does not know the camera man is near.

Making the exposure.—In making the exposure one should watch the bird until it is in a good pose and momentarily at rest. Exposures made while the bird is pecking food will usually be blurred. A slight sound will often cause the bird to pause and look up, giving the desired opportunity.

By keeping out food all through the year a series of portraits of many different birds can be secured all on the same log. The author, for example, has secured photographs of nearly twenty species on the same spot in a city yard, and the opportunities elsewhere near a woodland would be far superior. By having the box always in place, even the most timid new arrivals do not realize when the camera is substituted or placed beneath it and one need never waste time waiting for birds to get accustomed to the camera.

We might now proceed to some of the more difficult phases of bird photography. The same equipment with the addition of the tripod will be sufficient for photographing birds' nests and eggs or young birds which prove most fascinating to the amateur photographer. A word of caution is, however, necessary. Young birds should never be removed from the nest nor should they be disturbed just before they are ready to leave. Young birds are never brooded after leaving the nest and unless their feathers are fully developed they cannot stand the rain,

the sun, or the cold nights and usually fall victims to the weather or their numerous enemies. Neither can they be persuaded to remain in the nest when once they have been removed unless they are still helpless. One should wait until they have left the nest of their own free will and then catch them.

In photographing nests and eggs one should be very careful not to destroy any of the surrounding vegetation which conceals them. It is usually necessary to press aside a few leaves or even a branch, but these should never be broken and should be carefully returned to their former position when the photograph has been secured. The nest should never be tipped to show the eggs. It is far better to tip the camera by means of a "tilting top" (a device that may be purchased for a small sum), and to push the eggs to the far side of the nest where they will show. In arranging the camera an effort should be made to show the surrounding vegetation and the nature of the retreat selected by the bird so far as is possible. The accompanying photograph of the floating nest of the pied-billed grebe,



BEFORE AND AFTER TAKING

Young birds make fascinating subjects for the amateur photographer, especially when the old birds will come to feed them. One should wait until they leave the nest and then catch them.

for example, shows it attached to the weeds fringing a pond—the pond and the woodland in the distance. No better description of the nest and nesting habit of the grebe could be desired.

Photographing the birds at the nest is perhaps the most absorbing phase of the whole field of photography. It requires the greatest ingenuity and skill on the part of the photographer and at the same time brings him closer to the intimate life of the birds than anything else could. It permits him unobserved to view at arm's length the home life of his subject—the solicitude of the parent birds for their young and their little attentions for one another—sometimes humorous, sometimes ludicrous, sometimes almost pathetic.

Even greater caution should be used in photographing

birds at the nest than in photographing nests and eggs, for any change in the immediate environment of the nest will not only make it visible to the birds' enemies but will usually cause the bird to desert, unless the young are full grown and nearly ready to leave. The prime requisite in this kind of photography is some sort of a blind for concealing or disguising the camera. It can be made of branches and leaves just sufficient to hide the camera and tripod, and the shutter then worked from a distance as in feeding station photography, or it can be large enough to conceal the photographer at the same time. This is far the more satisfactory, for one's object should be not only to secure the picture but to learn something new about the bird at the same time. The most satisfactory sort of a blind is the so-called "umbrella blind," which consists of an umbrella strapped to a pole at the right height and a sheet of green or brown cloth hung about the sides—properly fastened and guyed so that it will not shake in the wind. This blind should be put in place—first at some distance from the nest—and then moved gradually nearer, several days often being allowed for the birds to become accustomed to it. The last step is to push aside the leaves in front of the nest so that, when the lens is pointed through a slit in the blind, an unobstructed view can be obtained. Much time will now be saved if the photographer can have a companion who will go to the blind with him and leave as soon as everything is ready. Unless the bird sees or hears some one leave the blind it will usually remain suspicious for a long time, but, as they cannot count, one person leaving is as good as two and the bird soon returns. After the bird has once decided that all is well, the photographer can make considerable noise and movement within the blind without frightening it. Any number of exposures can be made—plate holders changed—notes written—all within a few feet of the unconcerned birds. If there are eggs in the nest, one will see how carefully they are adjusted, how the feathers of the breast are lifted and parted so that the eggs will come in contact with the "brood spots"; he will see the parent bird preen its feathers—arrange the nest materials or perhaps pull down leaves to better conceal itself. Occasionally the mate will come bringing food, or they will exchange places, often with a delightful little ceremony. If there are young, the old birds can be watched bringing food, cleaning the nest and so forth. One will be close enough to identify most of the food

brought to the young and observations can be made on the economic value of the birds. Best of all, everything can be accurately recorded by the camera and one's observations communicated to others far more graphically than by pen or by word of mouth.

The possibilities for the use of the camera and the blind are almost unlimited.

Every bird presents a different reaction, a new problem to be solved, and while the general principles which have been laid down will hold for all birds, scarcely two birds will respond in the same way, so that one's ingenuity will be continually taxed to the utmost. Some species are extremely stupid, others extremely intelligent; some are very wary, others very tame; some are most easily studied when incubating, others when brooding; and still others only after the young have left the nest. Even within a species no two birds are just alike and one may find dozens of nests where the birds never get tame enough to photograph and suddenly



THE UMBRELLA BLIND

A good method of studying and photographing birds is by means of the "umbrella blind," which is here seen set up in a daisy field near the nest of a bobolink.

stumble onto one where the bird behaves like a domestic fowl. In no way is the individuality of the bird better brought out than by an attempt to photograph it and gain an insight into its intimate life.

But enough has been said to point out the initial steps which the naturalist photographer must take and although the road is beset with difficulties, it is so paved with fascination that, once upon it, it is difficult to leave until the height is reached and one looks back upon his efforts, his failures, and his achievements with the knowledge that what he has done is permanent and that the world is richer for it. What would we not give, to-day, for a photographic record of the hordes of passenger pigeons that once flocked across this country, for a picture of one of the herds of bison that roamed the plains, for a glimpse of the home life of the Labrador duck, or the Carolina parakeet or any of our vanishing wild life that may soon be gone beyond recall! True, we have passenger pigeons in our museums and bison in our parks, and pages by the score descriptive of their former abundance, and we have artists like Fuertes and Lodge and Thorburne and Brook who can almost make the birds live. True, likewise, the photograph has its limitations, but if we wish to hand down to posterity an exact representation of our wild birds to-day and a few square feet of their environment, no better means has yet been devised than that of the maltreated and much-maligned camera.

THE SLASH PINE

BY WILBUR R. MATTOON,
FOREST EXAMINER, U. S. FOREST SERVICE

THERE is a species of pine in the southeastern portion of the United States, little known, yet of notably rapid growth and very high commercial value. It is a better tree intrinsically than the well-known longleaf pine. Its growth is more rapid, its wood heavier, harder, and stronger, and its yield of turpentine larger and of a better grade. This tree is slash pine (*Pinus caribæa*). It is extensively cut and contributes, at a rough estimate, over a billion board feet annually to the yellow pine lumber output.

Slash pine is not well known, either generally to the public or silviculturally to the forester. The cause in each case is clearly apparent. The tree has been designated by at least four different botanical names. And in Forest Service literature it was formerly called "Cuban" pine but is now officially known by the

name here used. The wood of slash pine closely resembles in its structure the heaviest grade of longleaf pine, and as such it is sold on the market without discrimination. The juvenile and young trees look much like loblolly pine, and the more mature trees equally resemble longleaf. Among persons of trained observation mistakes of identification of slash pine have not been infrequent, while on the part of almost all others, except observant turpentine or logging men, the species as a rule escapes recognition. Furthermore, this section of the country is the last east of the Mississippi River to be included in intensive silvicultural studies by those interested in the future management of the country's forests.

All indications are that slash pine possesses in the highest degree the essential silvicultural qualifications for profitable handling



GROWTH AROUND PONDS

A characteristic of slash pine is its occurrence as almost exclusively the only forest tree in a broad band around the margins of the countless "ponds" scattered over the coastal plain from South Carolina to Louisiana. On the opposite margin of this pond in South Carolina the slash pine trees may be seen in the right background. The measured yield was about 18,000 board feet of saw timber per acre.



TYPICAL LOGGING VIEW IN MATURE SLASH PINE FOREST

The trees are cut and sold on the market without distinction as longleaf pine. The wood of slash pine is the heaviest, hardest, and strongest coniferous wood grown in the United States. It averages a little heavier than hard maple, beech, and sweet birch and is about equal to burr oak, yellow birch, and white ash.



A FIFTEEN-YEAR GROWTH

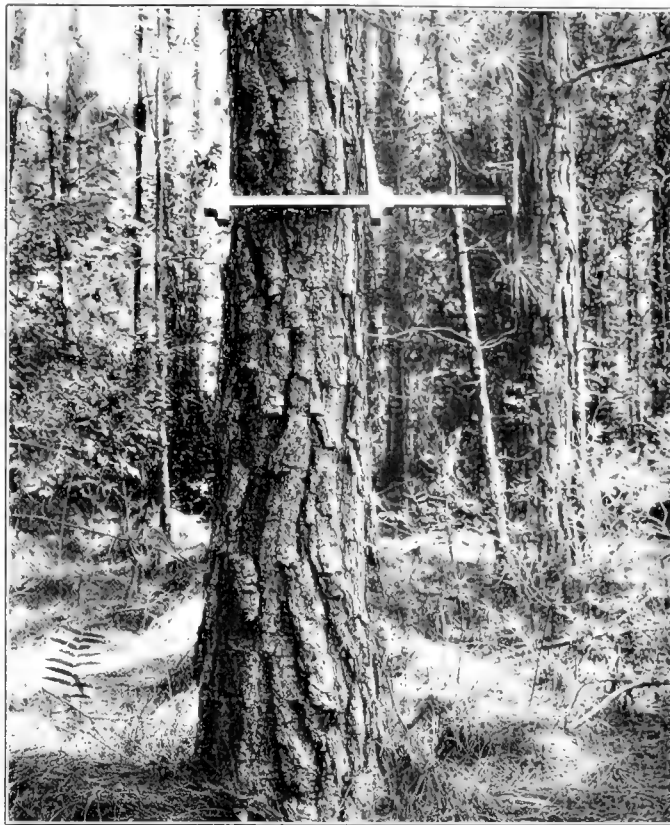
The characteristic straight, clean trunk of slash pine is apparent in this 15-year-old pole stand. The trees average 42 feet high and about 6 inches in diameter breast high. The inherent high tolerance by which the tree is enabled to grow rapidly in close density—about 1900 trees per acre in this stand—is one of the chief factors for the wide-spread advance of slash pine over lands formerly occupied by longleaf pine.

under forest management. Thinnings, for example, are very profitable on account of the by-product of turpentine derived prior to cutting the trees for ties, cordwood, poles, pulpwood, or other products. Recent studies of the yield of crude turpentine from young slash pine indicate for periods of from 15 to 25 years net returns of from 9 to 11 per cent on the investment in land. A reliable lumber authority in northeastern Florida recently estimated that of the total second-growth pine cut for sap ties and other sap timbers in the region, although all is sold as "longleaf" stumpage, probably not less than 90 per cent, as a rough estimate, consists of slash pine.

Following the removal of the virgin longleaf pine, slash pine is spreading rapidly over large areas of flatlands and moderately hilly uplands of the South Atlantic and Gulf coastal plain. This is due to its prolific seed production, its very rapid growth, its ability to grow under partial shade and in dense stands, and its adaptability for growing on the poorest

sandy soils and poorly-drained flatlands of the South. It adapts itself and grows rapidly on practically all soils except the very deep, dry, upland types, where the mammoth tap-rooted longleaf alone succeeds. The seeds and seedlings of slash pine are not touched as food by hogs, which is in striking contrast to the enormous destruction of longleaf by these animals. In three years it attains a height of from 3 to 5 feet; while at the same age longleaf is just emerging from the ground and beginning its real battle with fires, which burn practically every year in the South. With protection from hot fires for about the first two years, slash pine often succeeds in coming through with a sufficient number of saplings for a good stand.

The range of slash pine extends from Charleston, South Carolina, southward to the Keys of Florida and westward through Georgia, Alabama, Mississippi, and Louisiana to the Mississippi River. It has been found by the writer occurring on several hundred square miles in southwestern Lou-



AN AVERAGE SEVENTEEN-YEAR-OLD

This slash pine is 10.8 inches in diameter (breast high) by 61 feet tall. It is the average tree in a 17-year-old stand near Glen Saint Mary, Florida. In this time the stand has produced 12,600 board feet of saw timber per acre, scaling all trees 5 inches and over in diameter by mill scale. The thick mat of pine needles ("straw") is evidence of the fire protection which has been continuous during the life of the stand.



CHECKING WIND-BLOWN SAND

On Santa Rose Island, on the coast of western Florida and one of Uncle Sam's Military Reservations, slash pine succeeds in spite of the tropical hurricane and continually shifting sands. The view shows the effect of the trees in checking the movement of wind-blown sand.



AND FOR BEAUTY ALSO

Dr. Charles A. Sargent expressed the opinion that slash pine is "by far the most handsome of all southern pines." This sentiment appears to be borne out by the very pleasing bit of landscape shown here by a bungalow in the town of Slidell, Louisiana.

isiana, many miles west of the westernmost limits of distribution given by any botanical authorities of that region. Its range covers roughly about 35 per cent of the geographical range of longleaf, and extends beyond the latter over some 8 to 10 million acres on the Florida peninsula.

With some 20 to 30 million acres of land, mostly pine "barrens" and other poor, sandy lands, in excess of the maximum amount that will probably be utilized for all



HIGH MONEY RETURNS IN EARLY LIFE FROM TURPENTINE

In this 13-year-old slash pine stand, 104 trees per acre are being worked for turpentine. The remaining 524 per acre are yet too small. Unfortunately, the wasteful boxing system, instead of the cupping method, is being used. If cupped and properly handled, well-stocked stands like this will yield naval stores for a period of from 25 to 40 years. At 10 cents per box, the present local price, this stand is bringing its owner \$10.40 per acre for a by-product which does not necessarily appreciably lessen the value of the standing tree. The stand here shown is growing on flat, poor, sandy "pine barrens" in northern Florida, at present valueless for any other commercial purpose.

agricultural purposes during the next half century, it appears certain that slash pine will occupy an increasingly important place in that economic development which aims to put unused lands to their most profitable use. The future will undoubtedly see the pine forests of the South handled as second-growth stands of various ages, generally not exceeding 50 years. The species which will make up the future forest will, as a rule, be those producing in a given period the largest quantity of wood, combined with desirable intrinsic qualities of clearness, grain, and mechanical properties.

STATE FORESTS' VALUATION

PENNSYLVANIA'S million acres of forest land, which cost the state \$2,275,000, are now valued at over \$6,000,000, says Commissioner of Forestry, Robert S. Conklin. This increase is due to rising timber values, permanent improvement made by the Department of Forestry, and to tardy recognition of the fact that little trees grow into big trees and have an actual money value which is steadily increasing. Surely money put into an established business of this kind is an investment and not an expenditure.

ONE OF THE UNDREAMT-OF THINGS

By Lewis E. Theiss

WHILE pruning a plum tree last spring I found two cocoons which I secured and placed in an open box inside of our screened dining porch. In due season two moths emerged—females of the species *Callosamia promethea*. Though not particularly brilliant in their markings, they were nevertheless very beautiful. Their wings were perhaps three to four inches in spread. Shortly they crawled from the box and up the screening, where they remained.

That evening half a dozen moths of the same kind were fluttering eagerly outside the screening. In the *Girl of the Limberlost* Mrs. Porter tells how a moth in the swamp exuded a yellow fluid on the shoulder on the Girl's mother, where it clung, and thus attracted other moths. We watched to see what would happen here. One of the moths did exude a few drops of a yellow fluid which hung in shining drops in the meshes of the wire. Our interest was now keen and we kept close watch.

That evening fully twenty-five moths, both male and female, of the same kind, came fluttering at dusk to our porch, and all night those without tried to reach the two imprisoned moths within. On the following day several of the moths remained during the entire period of daylight, and at dusk at least forty moths were fluttering about the screens. There were so many it was impossible to count them accurately.

To us, who had never even seen a moth of this kind before, it was a great treat. It convinced us of the truth of Hamlet's observation to Horatio: "There are more things in heaven and earth, Horatio, than are dreamt of in thy philosophy." For we had never dreamt of such a sight as those beautiful moths afforded as they fluttered without our screens.

Now we are going to do what we should have done long ago—learn about some of the undreamt-of things; and already we have a box full of various cocoons and chrysalids, and the spring pruning will yield more. Truly we mortals are a blind race.

MICHIGAN IN THE PINE BLISTER FIGHT

THE Michigan Committee for the Suppression of the White Pine Blister, composed of Professor L. R. Taft, state inspector of orchards and nurseries; Dr. Filbert Roth, Director of the Forestry Department of the University of Michigan, and A. C. Carton, of the Public Domain Commission, have prepared an amendment to the Michigan forestry laws, providing reimbursement for the owners of pine trees, gooseberry and currant bushes which may have to be destroyed should the blister invade Michigan. The Commission provides to stamp out the disease the moment it makes its appearance.

PRAIRIE dogs have practically been destroyed over 767,000 acres of National Forest range in New Mexico and Arizona within the last five years by the Biological Survey. During this period, a total of about 2,500,000 acres of Government land in the West has been relieved of range-destroying rodents.

EARLY SPRING AND SUMMER FLOWERS

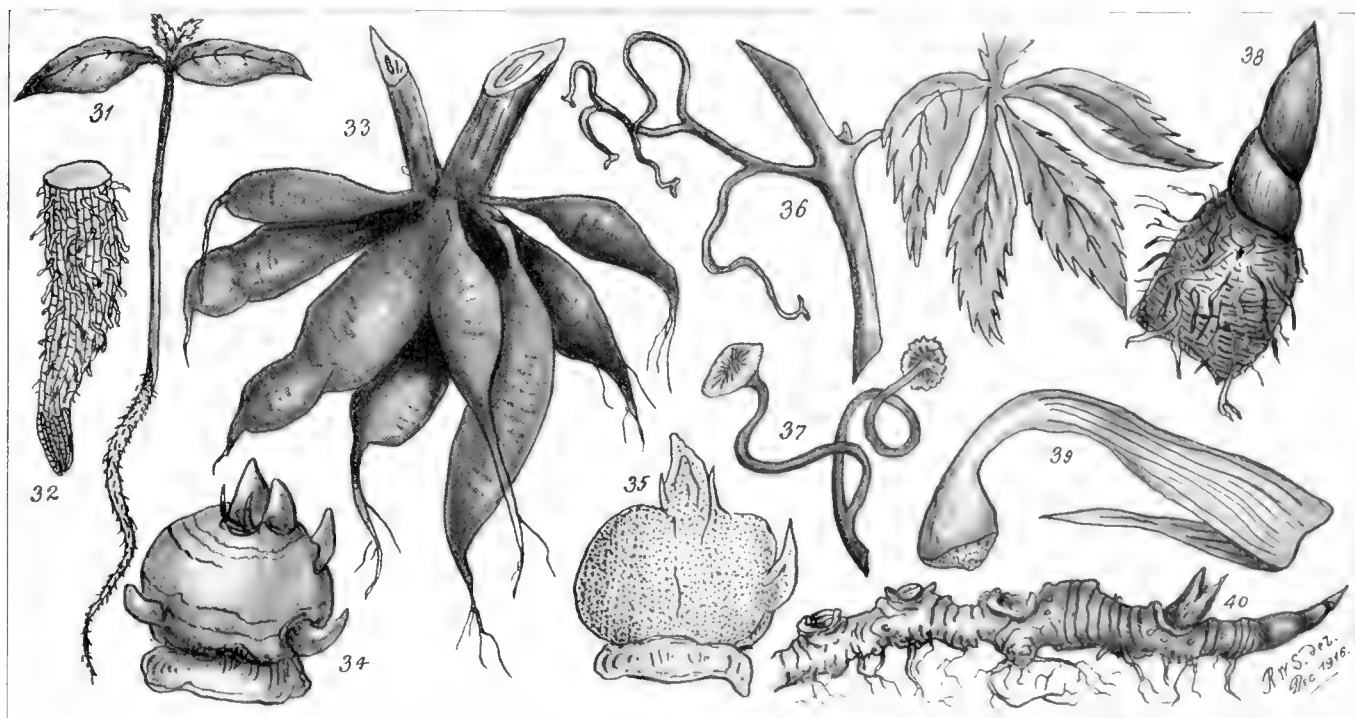
BY DR. R. W. SHUFELDT, C. M. Z. S.

EDITOR OF THE DEPARTMENT OF WILD FLOWERS

OF all the different methods of studying wild flowers, there is none better than to transplant them from where they flourish in nature to the home, and there watch their daily growth and development at our leisure. Of course this applies, as a rule, not only to those that will bear transplanting and not be injured by it, but to those which are of a convenient size for experimentation of this kind. There are hundreds of plants in any region, in any part of this country, which it will repay the student of flowers to observe during the various growth-variations that take place in them, from the initial stages of their seed-germination, to include the several stages of decline and death. Any medium-sized room, properly heated and lighted, will answer as a laboratory for such experiments

and observations. There should be flower-boxes of suitable sizes, filled with various kinds of soils and sand, placed on tables where the sunlight may reach them, in order to maintain, as nearly as possible, the conditions which the species selected for observation enjoy in their normal ranges in nature. During some experiments, too, some of the boxes may be kept in the shade, and still others in utter darkness.

A first-class microscope with its complete equipment, as well as a good hand-lens, are the chief instruments required in work of this class. When some of your plants begin to flower, they should be by an open window, in that you may observe as many as possible of the various species of insects that visit them, and the part they play



ILLUSTRATED GLOSSARY—ROOTS, TENDRILS, AND OTHER STRUCTURES

Figure 31 illustrates the root-hairs on the primitive root of the seedling maple, and Figure 32 is the extreme tip of the same root, magnified many times. The absorbing surface of roots is enormously increased by the presence of these root-hairs. It is surprising how rapidly they can supply all parts of the growing plant above ground with moisture. A large number of annual plants, such as corn for example, possess roots of this character; they are called fibrous roots, as they have the structure of certain kinds of tuberous fibers. The various forms of fleshy roots and their functions have already been defined and described in the "Glossary" for last month.

Good examples of tuberous roots are seen in such plants as the common sweet potato and the dahlia (Figure 33). Such growths possess no main root, while the nourishment for the growing plant is stored in these tubers. The common peony is another good example of them. Common Irish potatoes are but tuberous parts of stems, and not really roots at all.

The nature of secondary roots is touched upon in the article in this issue, while in addition to these we have another class of roots known as aerial roots. Tropical forests supply the best examples of these, or in countries where the climate is particularly damp and warm. Good examples may be seen in sugar cane, and in various representatives of the fig tree family. Such roots are given off from the stem of the plant or tree above the ground, finally growing down into it, and then behaving just like ordinary roots. Throughout this country where plants or vines are found, we see splendid examples of aerial roots in the common poison ivy, in the trumpet vine, the fox grape, and the Virginia creeper (Figures 36 and 37). Aerial rootlets of the class here alluded to are principally applied to climbing, rarely having anything to do with the nourishment of the vine or plant possessing them. In most cases they take the place of tendrils, as just

pointed out in the Virginia creeper; they cling by their suckers (Figure 37) to trees, walls and buildings, and never develop buds, leaves, or thorns. Underground or subterranean stems and branches must not be confounded with roots. In the first place, there is the ordinary rootstock or rhizoma; secondly, the tuber; third, the corm, and lastly, the bulb. A rootstock is a creeping branch or stem found below or partly below the surface of the ground. Two kinds of rootstocks are shown in the illustrated glossary above. In Figure 38 the short rhizoma or rootstock of a trillium, from which the bud is protruding above; in Figure 40, the rootstock of Solomon's seal. Note at its right-hand end the bud for the next year's growth, while on top, just to the left, the basal end of the old stalk of the present season is found.

A tuber is nothing more than the thickened part of a rootstock, and a very familiar example of it is seen in the common potato. The solid bulb or corm has excellent examples in the ordinary garden crocus, or in the Jack-in-the-pulpit. In Figures 34 and 35, the bulb or corm of the crocus is presented; in Figure 34 it is just beginning to sprout, while in Figure 35 there is a section of one of these bulbs, made vertically through its center. Small bulbs, attached to bulbs above ground, such as we see in the onion and common garden lily, are called bulblets. They are nothing more than dwarfed bulbs with thickened bases, and their usual fate is to become detached, to fall to the ground, and to grow as independent plants. In Figure 39 is the leaf of a common lily; its lower end, or the underground portion, is thickened into a "bulb-scale"; the dotted portion shows how thick it is. In the autumn the lily leaf dies down to this thickened base, which later remains a scale of the bulb. This goes on season after season, the bulb developing from the center, to produce the leaves and flowers of any particular year, the external scales surrendering their nourishment for the purpose, a purpose duly followed by their death and decay.

in the matter of fertilization and cross-fertilization. An accurate diary should be kept of all such observations, especially the names of the species and the dates. In certain small receptacles different kinds of seeds may be planted, and their modes of germination carefully studied and recorded. Indeed, there are hundreds of experiments



A WELL-KNOWN HARBINGER OF SPRING

FIG. 1.—Rue Anemone (*Anemonella thalictroides*) is one of the earliest flowers to bloom in the spring, and it belongs to the Crowfoot family (*Ranunculaceae*), in which group we also find such well-known plants as Clematis, Buttercups, Meadow Rue, Marsh Marigold, Columbine, and others. Rue Anemone has no petals, while there are four or five, often as many as ten, white, or sometimes pinkish, oval sepals. The roots are tuberous and small, and from them arises the wiry, slender, black stem. Leaves compound, 2-3-ternately, the leaflets being roundish, moderately three-lobed at the extremity, and heart-shaped (cordate). Flowers arranged in a sort of cluster, the flower-stem seemingly all springing from the same point on the upper end of the main stem. This common little flower occurs in the woods from southern New Hampshire, westward to Minnesota, southward to Kansas, and northwest to Florida.

to be made upon no end of plants in the region in which the observer has his or her home; and if systematically and intelligently conducted, no one may say in advance what important results some of the experiments may lead to in time. In this work do not forget the aquatic plants, but be sure to make provision for studying them through supplying the proper receptacles in which to grow them. As a matter of fact, many other lines of research and investigation will occur to you as the work goes merrily on.

You should visit the woods, fields, and other parts of the country just so soon as the first breath of the coming spring is felt. Go well equipped for collecting, and be sure you do not forget your botanical tin-can that comes for that very purpose. If the season opens up unusually warm, some of the very earliest flowers may make their appearance during the first week in April in the Middle Atlantic States. The best localities for these are bright, sunny places, in woods where the soil is rich, and the trees old and standing well apart, and you will not have gone very far before you discover that the anemones have started to come up; if you chance to be in a region where

they are more or less abundant, you will come upon them almost at once. They are very prone to appear near the roots of some large tree or other. The specimens shown in Figure 1 were growing within a foot of a big tulip tree, where they had sprung up amidst the dead leaves and other debris of the vegetation of the previous year.

This Rue Anemone possesses curious-looking, tuberous little roots, grouped in a small bunch; and if you aim to take the plant home for study, dig up the entire speci-



THE ROSY KING OF THE MARSHES

FIG. 2.—The Swamp Rose Mallow (*Hibiscus moscheutos*), one of the most conspicuous and beautiful flowers of the summer months, and one of the most beautiful. It belongs to the rather small Malvaceae family (*Malvaceae*), which contains several genera of Malvaceae. It is a tall perennial that grows from a yard to seven feet in height. The late summer seed pods are shown in Figure 3. The toothed leaves are large and pinnate, and the stem may be finely hairy above. Often the lower leaves are three-lobed, and the flower is well shown here, as well as the shape of the two-lobed petals. Below it, as to locality and range, Gray states: "Rose Mallow, and other Malvaceae, are common near the coast, east Massachusetts, and Maryland, also Lake Ontario, and common near salt springs, southward to Ontario and Missouri. July-September."

men, roots and all, packing it properly so it can be carried without injury—otherwise the delicate thing will wilt within the next half-hour. Very frequently you will find the Wood Anemone or Wind Flower (*Anemone quinquefolia*) growing close to the rue anemone; but the two are easily distinguished, as the former bears only a single flower, while the latter bears two, three, or maybe four

in a cluster, as shown in Figure 1. Generally, however, there are but three blossoms to the plant, the middle one opening first, and the remaining two following later. Thus the time of blooming is prolonged, and opportunity is given certain insects to perform the work of cross-fertilization, this service being usually accomplished by various species of early bees and bee-like flies. The leaves of the rue anemone are dark olive green, and in some respects are said to resemble those of the Meadow Rue in form and color.

As spring passes into summer in the Mid-Atlantic States, a great many flowers, representing a great number

tion, or else the lovely days of spring and summer will slip by, leaving us almost where we stood when the anemones began to peep above ground. As we follow the path through some shady wood, keeping ever near the brooklet whose crystal waters tumble along in the same direction, we may note, on every hand, the coming of the elegant early ferns; the patches of brilliant May Apples;



ONE OF THE RARITIES OF THE SHADY WOODS

FIG. 4.—A beautiful specimen of the Showy Orchis (*Orchis spectabilis*). This by no means abundant plant ranges from New Brunswick and New England southward to Georgia, westward to Missouri and Dakota. Most botanists place the 18 or 20 genera composing the Orchis family between the Arrow-root family (*Marantaceae*) and the Willow family (*Salicaceae*). It is not difficult, however, to recognize the Showy Orchis, especially with such a picture of it as is here presented. Note its two oblong-ovate, shiny leaves; its floral bracts, which are leaf-like and lanceolate in form; they generally exceed the flowers in number. Each flower has an undivided ovate lip, which, while usually white, may be, in some specimens, of a magenta pink. In the center of its range this Orchis is found in flower during the months of May and June.

many grasses and sedges, and scores of other plants which will flower as summer advances. The soft, balmy breezes of early June easily cause the tender leaves of trees and shrubs to tremble, as they come and go in gentle waves, having hardly the force to create so much as a quiver among the plants, now so luxuriantly appearing about their roots.

One very beautiful and very sturdy little plant in particular is quite oblivious to the nodding and bobbing of its breeze-shaken neighbors. This is the early Showy Orchis (*Orchis spectabilis*); and the flora of the region has no representative possessing a more interesting life-history, greater beauty, or more attractive form (Fig. 4). Its pair of large, glossy green leaves are broadly elliptical in outline and quite silvery upon their under sides. Note in Figure 4 how they develop just so soon as they push their way up through the debris of last year's vegetation. Your hand-lens will help not a little here; only you must imagine the flowers to be a bright pink—sometimes a purplish pink—with their lowermost petals white. The fertilization of these little plants is most interesting; for some female bees of certain species seem almost to be built along lines to effect the operation successfully, and this is later carried on by some species of butterflies.

Figures 2 and 3 are reproductions of photographs of the flower and seed-pods of the gorgeous representative



THE PERPETUATORS OF THEIR KIND

FIG. 3.—Along in the early autumn, in the Middle Atlantic States where the Rose Mallows grow, we find their tall, dark-brown stems, bearing a few equally dark-brown and withered leaves. Above these are the blackish-brown and opened seed-pods, arranged as shown in this illustration. The pods represent the fruit of the Rose Mallow, and they are usually 5-celled, with a great number of smallish dark-colored seeds in each cell. These are easily jarred out by shaking the long, dry stems.

of families and a still greater number of genera and species, begin to blossom. The display is almost bewildering to the collector, and still more so to the out-of-door photographer of flowers. However, from this bewitching array of form and color, set in every imaginable shade of green, tan and brown, we must select some subject for descrip-

of the Mallow family (*Malvaceæ*), it being the Swamp Rose Mallow (*Hibiscus moscheutos*). This great, rosy-hued beauty may be seen far off, be it growing among the tall, rank grasses of the salt marshes, or among the cat-tails, alder bushes, or forty other species along the edges of pools and ponds, or overgrown swamps, for the matter of that. It is probably the most striking flower of the entire flora of this country, and it reminds one very much

and admits the eager bee to her stores of golden pollen, then we feel that the summer is far advanced. As truly as the wood anemone and the bloodroot seem filled with the essence of spring and the promise of the opening year, so does this stately flower glow with the maturity and full-filment of late summer. Here is none of the timorousness of the early blossoms, which peep shyly out, as if ready



A MUCH-DESPISED WEED MAY BE A MOST INTERESTING PLANT

FIG. 5.—Upper parts of the longitudinally grooved stems or scapes of the Common Plantain (*Plantago major*), bearing the densely-flowered spikes of this very cosmopolitan and common plant, which occurs everywhere along the roadsides and only too frequently crops up in great numbers on our lawns and pastures.

of the common hollyhock of the gardens. Several true relatives of it, however, are to be found in the genus *Hibiscus*, as the Shrubby Althaea of our gardens (*Hibiscus syriacus*), which was introduced from Asia; the Flower-of-an-hour (*H. triornum*) from Europe, and a number of others, which it would require too much space to describe here. Descriptions of them are to be found in all of our standard botanics. Mathews tells us that "The most frequent visitors of the genus *Hibiscus* are the honeybees and bumblebees." Mrs. Dana gives us the following graceful paragraph on this species: "When the beautiful rose mallow slowly unfolds her pink banner-like petals,



ONE OF FLORIDA'S BEAUTIFUL FLOWERS

FIG. 6.—The Catharine Flower (*Thysanella fimbriata*) flourishes in the sandy regions of certain parts of Georgia and Florida. It belongs in the Buckwheat family (*Polygonaceæ*), and there is but one other species, the *T. robusta*, which flowers all the year around in the pine lands of Florida, while the above species flowers only up to about the first of January, lasting all summer. The flowers are a most delicate pink, with some pink and white and a few pure white. The leaves are very narrow and pubescent. It grows in bushy fashion about a yard in height, the root being small, tough, and for the most part slender.

to beat a hasty retreat should a late frost overtake them, but rather a calm assurance that the time is ripe, and that the salt marshes and brackish ponds are only awaiting their rosy lining."

It will not be necessary to give any further account of the lovely flower here shown in Figure 6, beyond what occurs in the legend beneath it.

In regard to sending flowers to the editor of this Department of AMERICAN FORESTRY for description, they should come in excellent condition if packed as soon after

gathering as possible, and mailed by parcel post direct to No. 3356 Eighteenth Street, N. W., Washington, D. C. Stiff cardboard boxes, or better still, cigar boxes, are the best receptacles in which to send them. They can be placed in several layers of well-dampened newspapers. Collect only the best and most perfect specimens, and send the entire plant if possible—flowers, stems, leaves, seed or fruit, roots, and all. Do not break the stems or roots, but curl them carefully so the specimen can be photographed, as was the Catharine Flower shown in Figure 6, recently received from Mr. R. H. Young, of Haines City, Florida.

Mr. Young, having read what was said about *Smilax* vines in the last November issue of AMERICAN FORESTRY, also kindly sent me fine specimens from his state of the Laurel-leaved Smilax (*Smilax laurifolia*). This particular "Green-briar" forms an exception to the rule, in that it remains "evergreen" throughout the season. Its berries are black, and its leaves vary considerably. We also have the Lance-leaved Smilax (*Smilax lanceolata*), specimens of which I have recently received from South Carolina; in this the leaves vary but little. We have in this country a good many other species of Green Briar, or Cat Briar as they are sometimes called, of the genus *Smilax*.

In Figure 5 we have a very excellent example of the beauty there really is in one of our most abundant and most heartily hated weeds. Every country lad in the United States, in the region where it grows, knows it well, and so does many a city lad, too. How many boys have been directed by their parents to rid the front grass-plot of this weed by the aid of a table knife it would be hard to say. But when we come to examine the plant, especially if we use a high-power microscope, our surprise is very great when we discover what a really beautiful flower this Common Plantain or Ribwort (*Plantago major*) has. It is of cosmopolitan distribution, and has many species related to it in its own genus of the Plantain family (*Plantaginaceæ*); the very rare *Litorella unijlora* belongs in the same group.

FOREST ROAD UNDER FEDERAL AID ACT

THE Secretary of Agriculture has authorized the location survey of a section of the first project in road construction submitted under the "National Forest section" of the Federal Aid Road Act. This section is the only one in the law which provides for actual construction of roads by the Federal Government. Roads built under authority of this part of the law are designed primarily to promote economic development and to serve public convenience in localities where much of the land is in National Forests. The proposed road on which action is taken is in the Apache National Forest, Greenlee County, Arizona. The preliminary estimate of the cost of construction of the 71 miles of road to be surveyed is \$342,500. Greenlee County proposes to hold a bond election to raise the necessary funds to contribute fifty per cent of this amount. An additional 29 miles of road in Apache County will be necessary to complete the project,

and, according to the preliminary estimate, will bring the total cost to \$420,000.

Approval of the plans for the survey was based upon the industrial resources which will be opened up and also upon the offer of one-half coöperation by the county.

Several other projects for which coöperation has been offered are pending for roads in California, Montana, and Idaho. Where two projects have equal claim for consideration, the decision will, it is stated, be made in favor of the one for which the best offer of coöperation is made.

BOY SCOUTS BATTLE MOTHS

FOR the first time in the history of the organization a state has called upon the Boy Scouts for help to battle a plague.

The state is Ohio and the plague is the Tussock Moth, a pest that was destroying the trees of Canton, President McKinley's home town. In a two weeks' campaign the Scouts collected 3,000,000 of the eggs and as a result Troop No. 3, headed by E. R. Hoover, scout master, was awarded a large parade banner for collecting the greatest number of eggs. James Emsley made the best record for an individual scout.

The banner was awarded by Mayor Stolberg, who commended the work not only in this campaign but of the Scouts as an organization. So great was the interest in the campaign that was waged day and night for the two weeks that Prof. A. S. Barnes, of the Department of Entomology of Harvard, requested a quart of the eggs be sent to him for investigative purposes.

"The Scouts have not stopped the work, however," writes Scout Master Hoover, "but they are keeping right on with the campaign. This precedent of working under direction of state officials may be a help to other cities in looking after the trees and plants. It simply shows that the Scouts are on call and willing to help any municipality in any worthy cause."

The American Forestry Association at its annual meeting passed a resolution endorsing the Boy Scouts' work and urged them to get into the fight against the spread of the white pine blister disease.

MAPLES

By Richard Butler Glaenzer

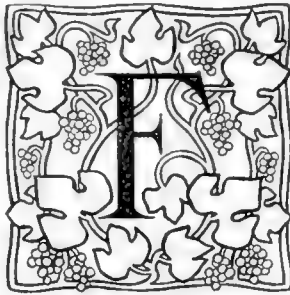
There is beauty in tropical samans,
Beauty and bountiful shade,
And the pride-of-India's plumes are fair
And cool till tempest-frayed;
There is splendor in poincianas
When flaming with birdlike flowers,
And mangoes invite when rich with fruit
Or blossomed to golden bowers;
Yet give me our northern maples
So sweet with sap in spring,
Even before their gay green gowns
Tempt robin and thrush to sing:
And give me their heart-leaved branches }
As shields from the searching sun, ^{we'll}
And their mourning dress of rainbow hue
When summer's course is run!



FORESTRY FOR BOYS AND GIRLS

BY BRISTOW ADAMS

THE WIND AND THE TREES



RIENDS in so many needs, as the sturdy trees are to man, it is hard to tell in just what ways they best serve him. After they are cut for use they may shelter him against the storm and may warm and cheer him before the open fire-place. But as standing trees—in the forest, in the fields, along the fence rows, and by the roadside—they are the best friends in all plant life. They are comrades, too; helpful comrades, each with as true a self as a human friend, and each worth knowing in all ways that we can know them. It is quite as true with trees as it is with folks, that the better we know them the better we like them.

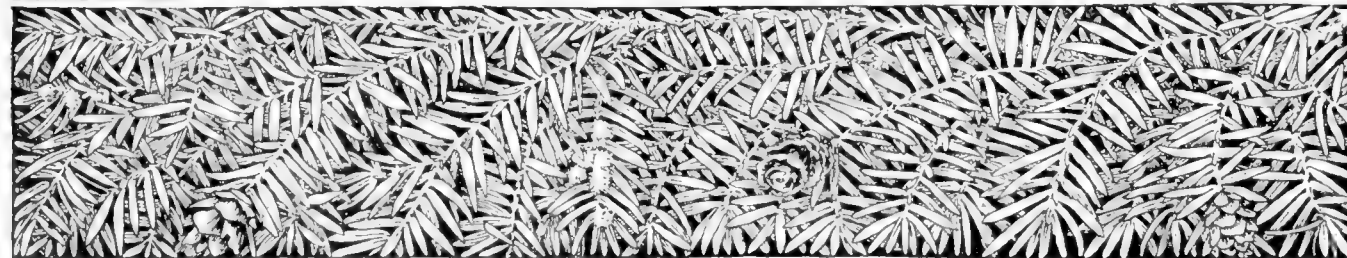
One meets a person who causes a dislike from the first; if one takes pains to try to overcome that dislike and to learn to know what good points there may be, the chances are that the dislike may turn to a kindlier feeling, or at least that it will grow less. Or one meets a person to whom one is drawn from the very first by the ties of a strong love; ten chances to one, the more one sees and knows of the good in that person, the stronger will the ties become. Try this, with either trees or folks, and see if it does not work out!



MICHAUX, the great French botanist, among the earliest to describe our American forests, made the great mistake, it seems to me, of setting down in cold black-and-white that our common scrub pine, or Virginia pine, was to him the most uninteresting tree that ever grew. I've always felt a bit sorry for poor little scrub pine ever since I read the sentence that Michaux passed upon it. For my part, I have ever had a tender spot in my heart for the sturdy and cheer-

ful ways of this tree, its ability to thrive on poor land, its rapid growth, its power to bear seed and start new little trees at a very early age, its firm grip on gullied hillsides to hold them from the washing rains. But most of all I like the staunch way it stands against the March winds, and shunts the gales a-roaring upwards, away from the many little negro cabins, and even from the larger homes in Maryland, Virginia, and southward.

We have reason to know about this tree, because the first house that we built, the home in which the two little boys were born, was in a clearing of these scrub pines. The trees that we cut away to make room for the house in the early spring helped to warm us on our hearth-altar during the following winter; and the belt of pines left to the northwest were a great defence against the cold winter winds, and the boisterous gusts of March. How much fuel they saved it would be hard to say; but we know well what a lull seemed to come in the storms when we gained the leeward of our little grove of scrubs. When the snowflakes swirled dizzily over the open fields, they dropped gently down behind our screen of pines and blanketed the garden against the bitter freezes of the exposed hillsides.

THUS, when March comes, I am likely to think of trees and the wind, and of the effects they have upon one another. March winds are very hard on the trees. March never has had a very good name among the months. The name by which we know it comes from Mars, the war god, whose reign all of us would like to see ended on earth forever. It cannot be denied that March is a wild and rough time o' year. The old Saxon name was Rede-monath, or rough month; it was also called Hlyd-monath, or loud month, because it was so boisterous. When the French Revolution set out to reform everything, even the calendar, it was Ventose, or windy month.





This is the time, then, when the trees perform their great service of shelter from snow and wind. In the still heat of simmering summer they make pleasant shade for the cows in the parched meadows, and their heavy crowns of leaves let scarcely a ray of sunshine through. In the winter, the little bare branchlets break the wind up into small eddies, and the trunks and branches, pointing upwards, direct the wind in the way it should go above the tiny home of man, nestling in the shelter of some age-old sycamore, or maple, or oak, or behind a belt of evergreens like our brave array of scrub pines.

IN whatever part of the country you may be, there is no finer sight than that of the farm houses, barns and out-buildings, behind their guardian trees. Some have been planted by the loving hands that built the first homes many years ago; others have been left standing for the shelter they would afford when the forest was first cleared away to make room for the farm.

In the New England states there will be graceful elms or spire-like spruces; in New York the sugar maple is not uncommon; farther south there will be hickories, then pecans, magnolias, great moss-bearded live oaks. There is not half so fine a sight anywhere as I have seen near the Carolina coasts where the crepe myrtle, a beautiful silver-barked tree, overshadows the dooryards, a protection from the damp and chilling winds of March, to be later covered with filmy blossoms of glowing pink. Where the color of leaf and bloom combines with the swaying grey Spanish moss on the same trees it is hard to imagine any growing thing more beautiful. For those of us north of Dixie's line, the crepe myrtle is known mainly as a shrub, and a rather tender one at that.

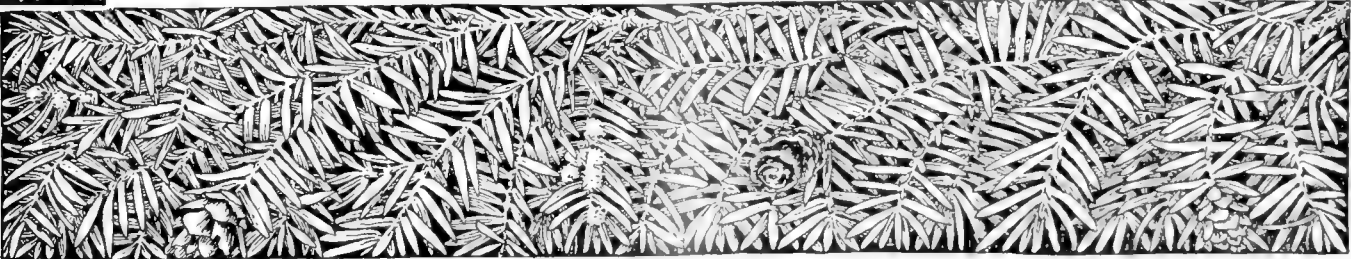
ON FLORIDIAN coasts the worst winds are sweeping hurricanes that level almost everything before them. There the cocoanut palms along the tide line of the Keys are likely to bend their heads toward the heaviest sea winds, so that their long fronds of leaves will not be stripped like umbrellas turned inside out by a wind that gets under. Here, too, the planters have set out the Australian

beef-wood tree,—the Casuarina,—which grows faster, even, than the eucalyptus from that great island of great wonders. The Casuarina trees bend over like whips so that the sixty-mile wind slides up along their slanting branches and is thus warded off of the precious orchards and crops that otherwise would be beaten down and destroyed.

On the Pacific coast, shaggy sentinels of eucalyptus protect the fruit ranches of California from the winds that sweep over the widest stretch of water in the world, and they also help to protect from the drying winds that sometimes set toward the coast from the interior deserts. In Washington and Oregon soldier-like ranks of Lombardy poplars stand to the defence of apple orchards; in the states of the great plains wind-breaks of hardy trees that can stand long periods of drought keep the winds from drying out the crops planted in their shelter.

WHERE there are such wind-breaks, or shelter-belts, it takes less corn to keep the cattle warm through the winter; it takes less fuel in the house. The chores are done easier; and trees are a sure agent in tempering the wind to the shorn lamb. Think what a host of tiny creatures would be lost each winter if it were not for their protection!

Therefore, when March winds blow, my sense of gratitude to the trees is at its strongest. With their help I can keep the coal bill down while winter is lingering in the lap of spring. I have to admit that they shut off the view of the lake from my study windows; but, on the other hand, that lake stretches out straight toward the North Pole for about fifty miles, and beyond it there is no great height of land to Lake Ontario. Beyond that not a mountain range intervenes between us and Hudson Bay. That is a clear sweep for old Boreas, and he makes the most of it. We feel that we can scarce make headway against him; we open our mouths to shout a defiance above the storm and he blows our breath down our throats. Then we come into the shelter of some great tree or of a group of trees; we can stop and gather ourselves together and take a real breath, and gain new courage to face the storm once more.



\$300,000 FOR PINE BLISTER DISEASE, AN EFFECTIVE QUARANTINE LAW

CONGRESS passed on Sunday, March 4, just before adjournment, two amendments to the Agricultural appropriation bill which are of vital interest to members of the American Forestry Association and to all interested in forestry and lovers of trees.

The first amendment added \$300,000 to the appropriation for the investigation and eradication of the pine blister disease.

The second gave the Federal Horticultural Board much needed authority to declare effective quarantines in the case of the pine blister disease and other tree and plant diseases.

It is these two measures for which the American Forestry Association and cooperating organizations have been striving since last fall when it became apparent that vigorous measures must be taken to save the five-leaved pines of the United States and Canada which are threatened with destruction by the disease.

If this appropriation and this revised quarantine law are now supplemented by the legislatures of the states in the five-leaved pine belt passing appropriations and adopting stringent quarantine laws to enable their state authorities to deal properly with this menacing disease, there is hope that it will be prevented from spreading and perhaps be stamped out. The various states already infected and others where the disease may appear are now considering legislation to deal with the situation.

One-half of the \$300,000 appropriation will be used by the Department of Agriculture in state cooperation, providing the states do their part in providing appropriations.

The original provision in the Agricultural bill was as follows:

"For the investigation of diseases of forest and ornamental trees and shrubs, including a study of the nature and habits of the parasitic fungi causing the chestnut-tree bark disease, the white-pine blister rust, and other epidemic tree diseases, for the purpose of discovering new methods of control

and applying methods of eradication or control already discovered, \$85,915."

The amendment added the following paragraph:

"For applying such methods of eradication or control of the white-pine blister rust as in the judgment of the Secretary may be necessary, including the payment of such expenses and the employment of such persons and means in the city of Washington and elsewhere, in cooperation with such authorities of the states concerned, organizations, or individuals as he may deem necessary to accomplish such purposes, \$300,000, of which \$150,000 shall be immediately available, and in the discretion of the Secretary of Agriculture of the remaining \$150,000 no expenditures shall be made until a sum or sums at least equal to such expenditures shall have been appropriated, subscribed, or contributed by state, county, or local authorities or by individuals or organizations for the accomplishment of such purpose: Provided, That no part of the money herein appropriated shall be used to pay the cost or value of trees or other property injured or destroyed."

The existing quarantine law permitted the Federal Horticultural Board to declare a quarantine only where a dangerous plant or insect infestation was known to exist. This was entirely inadequate. What was needed was a law giving the Board power to declare a quarantine where such a quarantine was necessary to prevent the spread of the infestation. The amended law gives the Board such power and it may now declare a quarantine which will be effective in preventing the spread of the disease, in any state or territory or any portion of them, and in any section of the country.

It is expected that one of the first acts of the Board will be to establish a dead line through the great plains states in order to prevent the pine blister disease spreading into the West.

A FEATHERED DOG IN THE MANGER

BY LEWIS E. THEISS

THE story of the dog in the manger was intended to be a take-off on humans, but the situation portrayed sometimes has its counterpart among the dumb animals. A commotion on the back porch of a Pennsylvania home led to the discovery that birds were trying to secure the dry and shriveled berries of some black alder branches that had been used for Christmas decorations and subsequently put temporarily on the porch. In order to see the birds well, these branches were at once fastened to a low limb of an elm tree that swung just outside a window.

Shortly the birds flew down to the berries and proved to be those beautiful creatures, the waxwings. Sixteen of them came to feed, singly or in groups, on the dried berries. Some of these berries, which had fallen to the ground, had been picked up by the householder and put on the window sill; and there the waxwings perched unafraid and ate, although the householder and his family stood on the other side of the glass pane watching them.

When the feast was at its height, an enormous fat robin flew down to the berries, and, darting this way and that, soon drove the waxwings away. But he did not eat the berries. In fact he showed no interest in them. When the waxwings returned, he drove them away again. Then he took his stand on a nearby tree to guard the berries. The waxwings collected in the same tree, and there they sat, eying the robin. He made no move until a waxwing tried to get a berry. Then he darted at the offender. It was a curious sight to see these birds sitting in the tree, motionless, and watching one another.

When it became perfectly evident that the robin's sole motive was to keep the other birds from food he did not want, the householder went out and threw a snowball at him. All the birds flew away. But the berries were an irresistible magnet and soon the waxwings were back. Immediately the robin dashed on the scene and drove them off. Then he perched on the tree and mounted guard.

COLLECTING TREE AND FLOWER SPECIMENS

BY DR. R. W. SHUFELDT

AN invaluable aid in studying our wild and garden flowers is a good microscope, as powerful and standard a one as your purse can buy. You will not proceed very far into the field of even popular botany and wild flower study, before you find that it will require a stronger eye than the one you have in your head ere you can accurately discern all there is to be seen in a flower. Some of the modern microscopes are superb instruments; not only are they great and accurate magnifiers of minute structures, but they admit of the use of special accessories, so that one can either draw or photograph the object under examination. There are many types of fine and inexpensive microscopes on the market, which are almost indispensable to begin with, while the high-powered ones can be commanded after the student is satisfied that the study will be with him as long, perhaps, as he lives.

The forming of a working, scientific herbarium is another step in the study of flowers and it is quite a task, and requires special knowledge along a variety of lines. In the first place, you must know how to collect scientifically: to select in the field, or in nature, to speak more broadly, the class of material worthy of your care, and measuring up to what the specimen demands in any case. Always select the most perfect specimens, from root to flower. Keep collecting until the entire life-history of the plant is completely illustrated. Show the normal as well as the abnormal, and all the necessary variations of all the structures of any plant you bring in. Take leaves, for example: of course the forms assumed by them are infinite, even for the same species. Still we may, by judicious selection, very well illustrate the limits in any direc-

tion with a very few examples. A good way to study such a point as this, is to select some big oak tree, standing so far in the open that there is no danger that its fallen leaves in the autumn have become mixed up with those from any other tree. You will be surprised at the number of

forms the leaves seem to have; yet, when you have judiciously collected forty or fifty of them and arranged them in a row in your study, how few it requires to actually illustrate, not only the variation, but also the fact that the leaves belong to that particular species of oak, provided the tree you selected was not a hybrid.

You must collect your flowers, seeds, seed-pods, roots, buds, and all the rest, in the same scientific manner. Collecting-boxes for use in the field can be obtained at any first-class naturalists' supply establishment, anywhere from fifty cents to two dollars and a half. Get the best every time. There are also admirable contrivances for the pressing of flowers manufactured, with instructions for using them, such as Riker's Botanical Press; wire presses, and plant presses of various models; all are excellent as well as indispensable.

In pressing flowers one must use every bit of one's scientific and artistic sense, in order that the pressed specimen shall exhibit every point and character it possesses, and every point one desires to show. One should likewise be familiar with all that is known up to date with respect to preserving the color of flowers, leaves, and other plant-structures during their pressing and preparation for permanent preservation.

In the summer, after any of your specimens are pressed, you may consign them to temporary folders until your



INSTRUMENTS USED IN PRESERVATION OF PLANTS

Behind the microscope shown in this picture is to be seen one of the covers (Venus covers) used in the Bureau of Plant Industry, of the United States Department of Agriculture at Washington. The specimen is a Rose Marsh Mallow (*Hibiscus moscheutos*), and forms a part of the Economic Collection. Note how the pressed flower is always fastened very carefully with little gummed slips, in the manner shown, on the right-hand page. Note the "data label" in the lower right-hand corner, giving full information about the specimen. The instrument shown is the "Spencer Dissecting Microscope," and near it are the dissecting needles, extra objective, and spring forceps with curved ends. One of these microscopes may be purchased for \$9.00. Directions will later be given for the use of this instrument, with further details on plant preservation.

winter work and studies come around. The larger magazines may be pressed into service for this purpose, while the chief thing to be attended to is to see well to it that your stack is kept in a dry place with a proper weight on it, and where no one will handle it but yourself. When the season's botanizing is over with, you can enter upon the most inspiring and delightful task of starting your permanent herbarium. Special papers come for this, and they are of two kinds: one for the leaves (white or cream), and one for the covers (tan or brown). They are both after the order of parchment paper—heavy, durable, untearable, and of heavy weight. They should be of folio size; each page devoted to a specimen, unless it be too small, when several may be artistically arranged on one page. In the lower left-hand corner there should appear, neatly printed, written, or typewritten, the following data: the scientific name of the specimen according to the most recent authorities; the most widely employed popular name in brackets; the place and date of collection; the name of the collector, with a few lines on the color of the flowers and leaves; sexual characters, and the normal form and color of parts that become much distorted and changed through the process of pressing.

These folios should, as they are being completed, or even when in actual use and being continually added to, be filed in a special cabinet, with the compartments arranged according to the system you are employing in your work as to orders, genera, and so on.

My hope is that the few paragraphs I have been able to give here on this subject will induce many a boy and girl in various parts of the country to start an herbarium of the trees, shrubs, and plants of the region in which they live. Later I will give other rules for the preservation and illustration of plant-life, such as methods of taking imprints of leaves for comparison, and so on.

There is still another powerful adjunct to the flower-student's equipment, which must not be overlooked in this preliminary chapter on the subject: the photographic camera. Flower photography is a very expensive and often very difficult pursuit. Many things enter into it requiring special skill, long training, and experience, before one can hope to be at all successful. Some of the main things to be considered are: the selection of a complete and scientific outfit for studio and field-photography of flowers; as complete a knowledge as possible of the flowers to be photographed, and the use of a camera and its accessories in the field under all conditions, such as time, place, and weather. Your artistic sense will come powerfully into play here, in the studio as well as in the field, and you will soon realize that the point of view from which a flower, a shrub, or a tree is taken makes all the difference in the world when the final result of the operation appears on paper, or is thrown upon the screen at a lecture. Much more may be said on this most important subject, so I will, from time to time, furnish brief, illustrated accounts in *AMERICAN FORESTRY* as to how all manner of specimens in the vegetable world should be photographed.

NATIONAL FORESTS GIVEN PERMANENCE

AS a result of land classification work, more than eight million acres were eliminated from the National Forests in the last fiscal year, and, in addition, over 1100 individual tracts within the Forests were made available for homestead entry, according to the annual report of Henry S. Graves, Chief of the Forest Service, which emphasizes the necessarily permanent character of the National Forests, and points out the importance of definitely determining the status of the land which the Forests contain.

"The National Forests," says Mr. Graves, "are gaining in stability through the land classification work. It is important for the general public to know what lands are to be retained permanently by the Government, and what lands will be available for agricultural settlement. The whole Forest enterprise is based on the assumption of permanence. All the work is conducted with a view to constructive development of the property and its constantly increasing usefulness.

"Every timber sale is made with a view to future consequences. The work of protection from fire is not only to prevent the destruction of standing timber but to save young growth and encourage the natural reproduction on lands which have been injured by previous abuse. Millions of trees are established each year which will not come to maturity for a very long time. A regulated system of grazing looks to the upbuilding of the Forest range, as well as to its present use; and the investment of public funds in extensive improvements is predicated on the permanence of the Government enterprise."

The need for consolidating land ownership where Government and private lands are interlocked is pointed out by Mr. Graves. Congress has, he states, already authorized an exchange of lands on the Florida, the Oregon, and the Whitman National Forests. Under the same policy exchanges have been or are being negotiated with South Dakota, Montana, Idaho, and Washington for school lands in the National Forests located in those states. The consummation of three of these exchanges now awaits final approval by Congress.

Other measures which will have a far-reaching significance in relation to the permanence of the National Forests, says the report, are the appropriation by Congress at its last session of ten million dollars for the construction of roads within the Forests and that of three million dollars to extend the National Forests in the eastern mountains by purchase. "The appropriation for the construction of roads will permit the opening up of regions heretofore inaccessible, will greatly increase the use of the resources in the Forests, will shorten lines of travel across the states and between communities, will stimulate prospecting and mining in mineral regions and will aid community upbuilding.

The importance of having public Forests at the headwaters of important streams has been recognized and greatly emphasized through the appropriation of \$3,000,000 for continued purchases of land begun under the so-called Weeks Law.

THAT TENT IN THE TREE

DOUBTLESS a tree is as odd a place as one would choose to pitch a tent, but the birds are not the only ones that select trees for a summer home; the caterpillar uses them as a summer resort and from now on is the time to keep a sharp lookout for the pests. True, the caterpillar does not pick out the same localities every year, for he seems as particular as people when it comes to find-



THE DESTRUCTIVE CATERPILLAR

Having an appetite that is seemingly never satisfied, the apple-tree tent caterpillars should be destroyed wherever he is found.

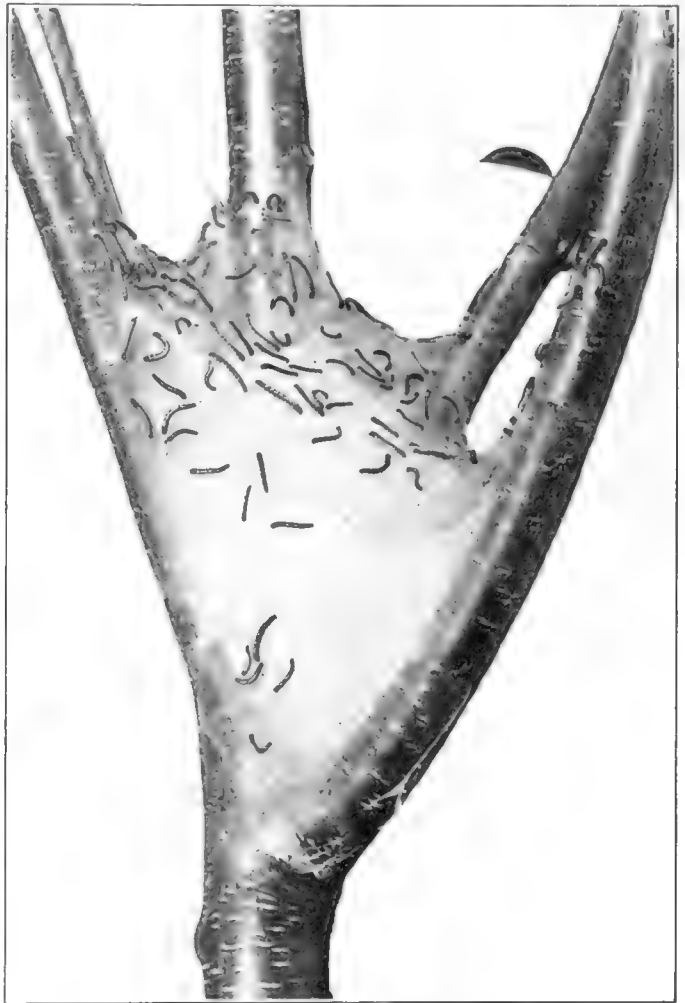
ing a new place to spend the summer. His appearance, however, is always an event; so much so in fact that the caterpillar's visits have been known as caterpillar years. The first of these recorded in this country was in 1646, when the historian of the Bay State Colony mentions the pests. Again in 1649 the new settlers suffered heavy losses from this fruit pest.

Wild cherry leaves are the favorite dish of the caterpillar and he also likes an apple or a plum leaf, although he does not confine his diet to these. The caterpillar will find his way, in the absence of his favorites, to the peach, pear, or rose and even to the beech, elm, and maple. He does this, too, at a time when the trees most need their foliage, and when he gets through, the tree is usually bare of leaves.

With the approach of spring an organized campaign can be inaugurated against the pest. Such organizations as the Boy Scouts could divide a town into sections and thus systematically examine every tree and fence corner. Recently the Boy Scouts of Canton, Ohio, campaigned

against the Tussock Moth with such results that they were highly praised by Mayor Stolberg.

A. L. Quaintance, in charge of the insidious fruit insect investigations for the Department of Agriculture, tells, in an article on this subject, how school children can help in saving the fruit. According to a report sent in by Myron A. Cobb, of the Central State Normal School at Mt. Pleasant, Michigan, the tent caterpillar had decided to spend the summer in that locality. Circulars were issued to rural schools and a "tent caterpillar week"



NEST OF THE TENT CATERPILLAR

The nest of this destructive insect is found in neglected orchards and in trees along roadsides. If these nests are low they may be destroyed by hand, but if out of reach they may be destroyed by some form of torch on a pole.

designated. The Elk Rapids Business Men's Association offered prizes for the greatest number of egg masses destroyed. The results were surprising.

Dr. M. R. Peck, of Cornwall, New York, organized the children of his neighborhood. The youngsters were instructed in destroying the "tents" and rewards were offered for the greatest number of egg clusters. The collection more than filled a bushel basket. What these places have done can be done anywhere if some person or the towns' newspapers take up the campaign and interest

the public by pointing out the tremendous loss from these pests every year.

As to methods of destroying the caterpillars Professor Quaintance suggests two. He says:

"Neglect to search out the egg masses during the winter will result in the appearance of the larvæ about the time the trees are putting forth foliage. The nests, at first small, are soon so increased in size as to attract attention. If the caterpillars are destroyed as soon as the small nests are detected, this will prevent further defoliation and the rule should be adopted to destroy them as soon as detected. In this work either of two methods may be employed, destruction by hand or with a torch.

"When convenient the nests may be torn out with a brush, with gloved hand, or otherwise, and the larvæ crushed on the ground, care being taken to destroy any caterpillars which may have remained on the tree.

"Use of a torch to burn out the nests will often be found convenient in the higher parts of the tree. An asbestos torch will be satisfactory, or one may be made by tying rags to a pole. Saturate either kind with kerosene. In using the torch great care is needed that no important injury be done the tree."

There are spraying methods, but these are not recommended in campaigns of this kind and should be only under the direct supervision of experts.

INDIA'S FOREST MANAGEMENT

A MEMBER of the Indian Forest Service, stationed at Mangalore, South Canara, South India, writes the following interesting letter:

The Editor, AMERICAN FORESTRY:

"I see your paper regularly and have a great admiration for it and for the vigorous fight being made in its pages for a sane Forest Policy by the state.

"I am not a United States citizen, nor do I know personally any member of the American Forestry Association, but if eligible I should like to join the Association.

"It is probably impossible for us in this country to realize the opposition which you are up against.

"Here the Government early secured complete control of practically all important forest tracts, and besides vast areas more or less wooded where conservation was deemed advisable. These great state properties, known as Reserved Forests, are administered by the Forest Service with something like a free hand, backed by the all-comprehending Forest Act.

"No important operations are carried on in the Reserved Forests except according to the provisions of carefully drawn up and duly sanctioned working plans, which prescribe, for a term of years, everything which shall be done in that forest. Prominent among such provisions are measures for improving the growing stock, which, with the soil, form the Capital on which fellings should represent only the naturally recurring Interest.

"It seems scarcely credible that Canada, for instance, should have yet to initiate her first working plan, and that the United States should be not much more advanced.

"Though it may be true, however, that our Indian Forests are steadily improving, while a large part of the timber stands of North America are deteriorating or even vanishing, yet I believe you would be astonished at the primitive methods of lumbering usually in vogue in India. There is little doubt that judicious expenditure on improved communications would enormously increase, say double or treble, the output without prejudice to situation or exceeding the possibility of the forests."

LOWEST FOREST FIRE LOSS

A LOSS to the Government of \$162,385 in timber, forage and young growth was caused by fires on the National Forests in 1916, according to statistics compiled by the Forest Service. Although there was more than the average number of fires, the loss is the smallest that has been sustained from fires since the National Forests were established. A favorable season in the regions where the most severe damage is usually sustained is given as the chief reason for the relatively small loss.

A total of 299,377 acres of Government land burned over. In addition to this, the fires covered 123,160 acres of privately owned land in the National Forests where timber valued at \$36,214 was consumed. About 44 per cent of the total area burned was located in the National Forests of Arkansas and Florida.

Of the 5655 fires which occurred, 4133, or 73 per cent, were confined to areas of less than 10 acres. Many of these small fires, according to the Forest Service, might have developed into serious conflagrations had they not been extinguished in their incipency.

The average cost of fighting each fire was approximately half that of former years. Lightning was the chief cause of the fires and was responsible for 23 per cent of all those which occurred. The causes of 18 per cent were unknown, while careless campers started 17 per cent. There was a slight increase in the fires of incendiary origin, as well as those started by sparks from locomotives. With the exception of those caused by lightning, all the fires were due to human agencies. One fire in Idaho which burned 600,000 feet of timber was caused by the carelessness of a ten-year-old boy.

The season was one of particular severity in the southwest, as well as parts of Colorado and Wyoming, where local weather conditions created at times a grave situation. In Washington heavy loss was caused by fires which started in inaccessible places and which the rangers were unable to reach for several days because of the lack of trails.

TOWN forests are featured in the annual report of the Massachusetts Forestry Association just issued by Secretary H. A. Reynolds. It is announced that last year saw two more town forests started, those in Brookline and Walpole, and seven other towns are preparing to establish town forests during 1917. The association has offered to plant fifty acres to young trees in the town forest which makes the best showing among the first ten to be established in the state.

PLANTING SUGGESTIONS FOR APRIL

BY J. J. LEVISON, M.F.,
FORESTER TO THE CITY OF NEW YORK

APRIL is the month when almost everyone is interested in some form of planting. We may be contemplating the planting of large trees on the lawn or of very small trees in the woodland. Our interest may be centered in setting out shade trees, fruit trees, shrubbery beds, vines or flowers. Every one of these is a field in itself, full of detail and special application. Just how to plant and what to plant, in each case, are questions of special local bearing and can only be discussed on general principles. At this writing we will consider the more important of them as well as the most desirable plants suitable for different purposes.

First of all, the plants should be selected at a nursery as early as possible in order to prevent delay in transportation when the season for planting arrives, in order to secure the plants at the lowest prices and to enable the nurseryman to ship the stock at the earliest possible moment.

With the stock ordered, one's attention should next be directed towards obtaining the proper soil and planning for the location of the individual plants. Where extensive plantations or beds of definite design are contemplated, it is always advisable to prepare a sketch and to plan everything on paper before undertaking the actual field work. The planting accessories, such as spades, trowels, hand shears, etc., should also be provided. With these preliminary steps considered, we are now prepared to undertake the actual planting. We dig the hole and replace the old impoverished soil with rich mellow loam. We see that the roots are protected and kept moist from the time of their arrival until the time they are placed in the soil. Too much stress cannot be laid upon this point, because even a few minutes' exposure may injure the fibrous roots which are the chief feeders of the tree.

Before placing the tree in the pit, the roots should be examined, all bruised roots cut off smoothly and the ends covered with coal tar. This prevents root decay and stimulates the formation of new fibrous rootlets. The tree should then be placed in the hole at the same depth as it stood in the nursery. The roots should be carefully spread out and mellow soil worked in tightly with the fingers among the fine rootlets. Every root fibre is thus brought in contact with the rich soil. More good soil should then be added (in layers) and firmly stamped and, before the last layer is filled in, thoroughly watered. The last layer should remain loose, so that it may act as a mulch or an absorbent of moisture. The crown of the

tree should be slightly trimmed in order to equalize the loss of roots by a corresponding decrease in leaf-surface. Where there is danger of swaying, the tree should then be fastened to a stake. These various stages of the planting process should receive particular care and attention.

What to Plant: There is often a wide difference in soil, moisture content and atmospheric conditions of locations which are not far apart. The plant suitable for one place may not suit at all for another place of similar outward appearance. I therefore hesitate very much to suggest any definite list covering all conditions and purposes. Yet a brief outline of the four most desirable trees for important special purposes may prove of service, and the following assortment is offered as a suggestion:

For city streets: Oriental Sycamore, Norway Maple, Red Oak, Carolina Poplar (where conditions for tree growth are unfavorable).

For suburban streets: American Elm, European Linden, Pin Oak, Sugar Maple.

For specimens on the lawn: European Beech and its weeping and cut leaf varieties, Pin Oak, Magnolias, Ginkgo or Maidenhair tree.

For evergreen screen: Hemlock, White Pine, White Spruce, Red Cedar.

For deciduous screen: Beech trees, Willow trees, Lombardy Poplars, Ash Leaf Maple.

For flowering trees: Dogwoods, Hawthorns, Magnolias, Horse Chestnuts.

For flowering shrubs: Azaleas, Forsythias, Weigelas, Spiraeas.

Shrubs with colored berries: Barberry, Bittersweet, Coral Berry, Snowberry.

Trees that color in the fall: Sweet Gum, Andromeda Arborea, Japanese Maple, Sour Gum or Pepperidge.

Shrubs that color in the fall: Sumac, Enonymus Alatus, Viburnums, White Flowering Dogwood.

Trees and shrubs with interesting bark: White Birch, American Beech, Red Stemmed Dogwood (Siberica variety), Yellow Stemmed Dogwood.

Plants for covering the ground: Vinca Minor, Pachysandra, Honeysuckle, English Ivy.

Vines to hold banks: Rosa Wichuraiana, Hall's Honeysuckle, Matrimony Vine, Forsythia Suspensa.

For seashore planting: Willows, Silver-leaf Poplar, Mulberry, Hydrangeas.

Trees and shrubs for deep shade: Hemlock, Beech, Viburnums, Privets.

ADVICE FOR MARCH

1. Prune apple and pear trees. Remove all dead branches, thin out carefully and cut from the top and sides so as to form low, compact heads.

2. Before the leaf buds burst, spray for San José scale.

It may be expected on fruit trees, lilacs, Japanese quince, dogwood, mountain ash, black and white ash, and elm. Use kerosene emulsion one to ten parts of water or some other well-recommended spraying preparation.

3. Remove and burn the cedar apples from the cedar trees. This will prevent the fungus from spreading to the apple trees and hawthorns in the summer time.

4. Prune the shrubs that bloom in the fall, but not the ones that bloom in the early spring. Examples of the former are hydrangeas and Rose of Sharon. Examples of the latter are Forsythias and spiræas.

5. Spray for cottony maple scale. One may expect this insect particularly on soft maples.

6. Prepare for planting. Order plants, have soil and manure in readiness and see that the tools are in good condition. In case of street tree planting also cut the holes in the sidewalk and prepare the stakes, guards, gratings and hose.

QUESTIONS AND ANSWERS

Q. I have a ranch in southern Kansas at the headwaters of the Medicine River, about two-thirds of the way across the state going west from the Missouri River. The climate is a typical continental climate, hot in summer and often quite cold in winter. There is generally a fair rainfall in spring and early summer, but from the middle of July till March there is generally comparatively little rain. Some of the land is irrigated, but most of it is not. Much of the land is broken, affording hill slopes with any desired exposure. There are canyons full of trees with walls fifty feet high. I desire to plant nut trees of all the kinds that I can hope to grow under conditions there and want necessary information as to where and how to secure the best seedlings and transplants, how many it would be desirable to plant of each species, and how and when this should be done.

E. D. R., *New Haven, Connecticut.*

A. We would suggest as the only practicable nut trees for planting in your locality black walnut, butternut, Japan chestnut and hickory. Young trees, either seedlings or transplants, may be had from nurseries in the prairie states, such as the D. Hill Company, Dundee, Illinois, or Storrs & Harrison, Painesville, Ohio. Planting is best done in the early spring, digging holes three feet wide and sufficiently deep to well contain the roots, using dynamite to break up troublesome rocks or hard-pan. Fill in with top soil, using no fertilizers, and leave a depression up the slopes to catch the rainfall. Keep circles three feet or more wide about each tree well cultivated for a year or more and protect from rabbits and vermin with wire or veneer tree guards. I would suggest planting about equal numbers of each species, setting the walnuts and hickories thirty feet apart and the chestnuts and butternuts twenty feet apart each way. You will note veneer tree guards advertised by the Burlington Basket Company in the December issue of *AMERICAN FORESTRY*.

Q. We have some pear trees about 20 years old, dying from what we thought to be pear blight, the trunks are dying. It's new to me, and I have not seen anything just like it. Is there another pear blight attacking in this way? I have been used to see branches dying back, which can readily be checked, but when the trunk itself gets diseased, it is a different proposition. Can you tell us what to do?

A. I am sorry to hear the condition of your trees, but last summer has been a very unfavorable season for pear injury such as you describe. It has been quite general in New York and Connecticut, affecting the trunks of the trees as well as the branches. Cutting out the affected parts is the best remedy we can suggest. Would also suggest that you call upon your State Agricultural Experiment Station to send a representative to examine the trees and advise you. This should be done next spring.

Q. Lawn bowling requires a green about 125 feet square, or larger. It seems a rather difficult matter to get it perfectly level and with the right kind of grass so as to make it perfectly level and true for lawn bowling, such as the greens they have in Canada, some of which are most beautiful and as level as a billiard table. If you have made any investigation of this subject and can give us any information, it will be fully appreciated. Will it be necessary to cover up for the winter a new lawn planted this fall, and what is the best way to protect it during the winter?

A. I am sorry to say that I have not been able to get any very definite recommendations, even from the experts here, with reference to overcoming the difficulties encountered in the preparation of your green for lawn bowling. I can say, in a general way, however, that the ground should be thoroughly prepared early next spring. Plow deep, put into the ground some well-rotted manure or some humus, and harrow. Then seed with a combination of red top, Kentucky blue, Rhode Island bent, and a little white clover—the first three in equal proportions. Then roll and do nothing further for winter protection. Under separate cover I am sending you a special bulletin relative to the cultivation of lawns.

Q. I should like to know which nut trees grow best in the vicinity of Sullivan County, New York.

Mrs. P. J. S., *New York City.*

A. You should have success with the cultivation of the following nut trees in the vicinity of Sullivan County, New York: English walnut, black walnut, pecan hickory (both shagbark and mockernut), butternut, and American beech.

Q. I own a summer home of about 26 acres, near Briarcliff Manor, N. Y. Having lost all my chestnut trees, I find that my hickory trees are now rapidly being destroyed by the borer. Last year I cut down and removed two fine trees, riddled with holes, and now I am losing another. What can I do to protect those still left?

C. F. S., *New York City.*

A. I am sorry to know that you are losing your trees, and want to suggest the following three things as your best method of protecting the remainder. Mark all the hopelessly infested trees in the fall, before the leaves drop, and remove and burn these trees before the following May. This is the most effective and dependable method of all. It is difficult to tell an infested tree at this season of the year, but if you are sure of any, remove and burn them before May of 1917. Remove and burn the branches infested with these insects. Such infestation will become apparent and the branches will show themselves as dead or dying some time in September or early October. You might try spraying the more valuable trees with a special formula put up by the Interstate Chemical Company, Bayview Avenue, Jersey City, N. J. This should be done in early July. Would recommend you to a special article on the hickory borer, in *AMERICAN FORESTRY* for July, 1915.

Q. What is the best time to trim box hedges and how often should they be cut?

B. R., *Plainfield, New Jersey.*

A. Box hedges can best be trimmed in early May when the growth first starts. Hedges should be sheared lightly. This work could also be repeated in August, but the early spring is the best time.

Q. I would like to get some advice on the transplanting of three arbor-vitæ trees which I must remove, as they are directly in line of where I am going to move a house; these trees are 35 to 50 years old, about 12 inches in diameter at the base and 30 to 40 feet high. Is it possible to move trees this size and this specie with any certainty of their living? I also have a large white birch about 30 feet high and about 15 inches in diameter, a maple about a foot in diameter, and an Italian chestnut about

the same in diameter, but of course not so high, which I want to transplant. If you can give me any advice as to how this work should be done, I would greatly appreciate it. They have to be moved within the next couple of weeks, and I would like to know about how far from the trunks these roots should be cut, and whether it is advisable to take the trees up now with whatever dirt that would adhere to the roots, or dig a ditch around and wait for a ball to freeze, putting manure and other protective material in the ditch as a protection from frost for the ends of the roots. C. H. S., *Noroton, Connecticut.*

A. It is not a very easy matter to transplant arbor-vitæ trees as old as yours, but with proper methods and care it can be done with a great degree of safety. These trees should be moved with an unbroken ball of soil at least 8 feet in diameter. It would be necessary to dig a trench around the trees about five feet from the trunks and then, in lifting the trees, barricade the ball so that it will not break in the process of transplanting. Messrs. Isaac Hicks and Sons, of Westbury, Long Island, N. Y., and Messrs. Louis and Valentine, Roslyn, Long Island, make a specialty of moving trees of that size, and if you write to them about it I am sure they can do the work in a most satisfactory manner. The white birch about 30 feet high is a more risky proposition to transplant at this time of the year, and I doubt very much whether you can save it. The maple and the chestnut can be moved in the same manner as the arbor-vitæ. It is too bad if these trees have to be moved at the present time, for if the work could be postponed to the early spring it would be a far more ideal time to do it.

Q. I desire some information regarding trees. On a farm near here trees will not grow. The people have tried several kinds, but all die off in no time. The soil is sandy. Long ago the valley was a lake. There is about three inches of real loam on the top and all the rest down is sand. Water is reached at from eight to ten feet. Terrific storms sweep over the valley both in summer and in winter. Farmers in that valley would like to plant trees as a wind-break and also to make the home look better. The winters are very cold and the sand is cold in winter, spring, and autumn. One farmer who has heard that certain chestnut trees stand cold well has thought of planting some. Now can you tell me what trees would be good for that kind of conditions? The soil seems to lack humus or something, for no matter how much you fertilize, it does not seem to decay and mix with the soil at all. M. S., *Greeley, Colorado.*

A. I do not see why trees that thrive in the region about Greeley should not succeed on the farm you mention. The honey locust, especially the thornless variety; the hackberry, including the common hackberry and the Mississippi hackberry; the black locust, the green ash, and, where it is possible to supply water for the first few years, the American elm, are the trees that we suggest for this part of the country, and they seem usually to succeed. Have you tried any of these? If you have, and they have failed, there must be some other unusual local condition that is the cause of the difficulty. Soil of the character you describe needs the addition of all of the organic matter that it is possible to incorporate with it.

Q. Your December number suggests fertilizing with well-rotted manure the soil about trees requiring nutriment. This I have tried, but with, in my opinion, very poor results—excellent to the surface soil—but distinctly questionable as regards the trees themselves. It is difficult by this means to penetrate through the sub-soil to the fibrous roots, whereas if holes were bored with a sharp crowbar, working the bar when driven, making the aperture larger at the ground surface, and the holes driven a few feet inside of the greatest circumference of the branches and these filled at the season with a proper fertilizer, infinitely better results should be obtained; but the question arises, what combination should be used? I have asked various authorities and all suggest something entirely different from the other—one

even suggesting Rochelle salts, which he has used with wonderful results. I would much appreciate any suggestions you might offer in this connection, as I have many white pines, oaks, maples, and elms that require drastic treatment, if they are to be saved. Would you think well of cow manure, ground bone-meal, and phosphates mixed in suitable proportion?

H. F. G. W., *Rye, New York.*

A. My idea of fertilizing trees with well-rotted manure is to dig a trench from two to four feet wide around the tree at a distance of four to six feet from the trunk. The trench should be about two feet deep and filled with one-third well-rotted manure and two-thirds good soil. Then I would place manure in narrow trenches running like the spokes of a wheel and radiating from the main trench toward the trunk. I have done this for twelve years to the trees in Prospect Park, Brooklyn, of which I have had charge for that period, and also to many of the trees in New York City, and always found this method to work well. My idea in using manure rather than commercial fertilizer is to supply the roots not only with plant food, but also to make that particular part of the soil serve as a mulch for the retention of moisture. After a while the roots penetrate into this new rich layer and form many new fine fibrous rootlets, and this is exactly the kind of action intended to stimulate by digging the trench and practically root pruning many of the large roots. I have even carried this sort of work to valuable evergreens, such as cedars and pines, by the thousands on 60 or more of the largest estates on Long Island. On Mr. C. Oliver Iselin's estate we have treated a whole cedar hill of large extent in this way. The idea of using commercial fertilizer such as bone-meal, phosphate, muriate of potash, etc., is very serviceable in many cases, but more to stimulate growth rather than to produce a permanent improved condition of the surrounding soil. I have used the commercial fertilizers in very large quantities, even this fall, but in each case with special care and for a special purpose.

Q. I have had a granolithic walk laid close by a line of fine elm trees. The work was done some years ago, and in order to get a suitable foundation, many elm roots were cut away. Since that time many small branches of these trees have died, and I suppose on account of the loss of roots. Can anything be done to preserve the trees now? B. P., *Brunswick, Maine.*

A. The death of small branches on the elm trees is very likely due to the earlier cutting of the roots. Perhaps when larger roots were cut they were not covered with coal tar and have in consequence started to decay. This would be a very difficult condition to overcome at this time, except by exposing these wounds and treating them. If decay did not set in, then the best thing to do is to dig in well-rotted manure around the ends of the roots, especially on that side of the tree where there is a chance for new rootlets to form. This will stimulate root formation. The trees are very likely also suffering from drought, and thorough cultivation and watering of the ground around the base of the trees to a distance of at least eight feet from the trunks in the summer months would do much to keep many of the branches alive.

Q. Can you tell me what a concrete storage house for a 10-acre nursery would cost and how large it would be? I would also like to know how many apple, peach, and pear trees can be grown to the acre in the nursery row. All I care for is the approximate number. A. H. H., *Detroit, Michigan.*

A. Replying to your inquiry relative to a concrete storage house for a 10-acre nursery, I would say that it would cost from \$500 up, but the best thing you can do is to get quotations from firms specializing in this sort of work.

Apple and pear trees should be planted twenty to twenty-five feet apart, in alternate rows, with about twelve feet between the rows. Plant peach trees about ten feet apart. I am sending you a bulletin on fruit cultivation.

EDITORIAL

EFFICIENCY AND ECONOMY IN OREGON

FOR several years prior to 1911, the state of Oregon managed its forest fire protection under a state official who combined the functions of forest fire warden with those of fish and game protection. His field force was supposed to fight fire, and at the same time to enforce the game laws. This plan has met with enthusiastic advocacy of efficiency and economy commissions and others in many states, but has been universally opposed by foresters on the ground that it is inefficient, and that men burdened with both of these lines are neither good fire wardens nor good game wardens.

But for the time being, consolidation won, and one man managed two departments, thus saving the state at least \$2000 in overhead expense. But, unfortunately, the forest fires continued to burn despite the alleged advantages of combinations. In the final year of this disastrous period of 1910, Oregon lost timber valued at \$1,640,997 on the stump—a loss which must be multiplied by five when we consider its value in wages and products for manufacture. The average annual loss for the three years 1908, 1909 and 1910 was \$663,935, and the total \$1,991,806.

In that year, the people of Oregon, having for the time being had enough of combination commissions as a means of fighting fires, decided to specialize. A separate forestry board of seven unpaid members was created, the Agricultural College, the State Grange, the State Forest Fire Association, the Wool Growers' Association, the Lumber Manufacturers' Association, and the United States Forest Service being represented. The Governor was a member of the Board. This Board was given power to appoint its own executive agent, who should be the state forest fire warden, free from political pressure and with no duties other than to see that forest fires in Oregon were suppressed.

During the six years following, under this system, with conditions fully as hazardous, the annual loss from fire has been but \$16,254, which is $2\frac{1}{2}$ per cent of the average for the three previous years, an increase in efficiency of 4000 per cent. This state work is conducted at an expense to the state of about \$17,000 per year, out of a total of \$93,000, the remainder being furnished by land owners, and by Federal coöperation, in the knowledge that it is well spent and efficiently administered. The losses in 1915 were but \$9333, and in 1916, \$905. In spite of this fact, the legislature two years ago again endeavored to combine this department with others under one of the familiar efficiency and economy programs, and only the desperate resistance of those whose interests lay in securing actual protection of state timber from fire secured the defeat of the measure.

But neither Oregon nor any other state in which forestry, under the Board system, has by the employment of technical men reached a condition of true efficiency, need

hope to avoid further well-meaning but misguided efforts at improving the machinery of government, until the whole matter is threshed out and the public at large recognizes the serious flaws which cause this theory of combination to fail in practice. That this leaven of education is working in Oregon is evident. In the **Oregon Voter** of January 27th appears the following:

CONSOLIDATION

"In this mania for consolidation of state officers and commissions, would it not be well for thoughtful people to consider whether the interests of true economy and efficiency will be advanced by wholesale bunching?"

"Is one paid political appointee or a paid commission likely to be more economical in the conduct of a lot of state work **with which he or it is entirely unfamiliar** than would be separate unpaid commissions, the members of which are devoting time, energy and judgment to doing public work well for the sake of the public weal?"

"Many of the commissions which it is proposed to consolidate are doing splendid, efficient work, because **the members of those commissions understand what they are doing and have their hearts in the work. Will there be economy in centralizing this work in the hands of a few who have no enthusiasm for it or interest in it beyond that which is hoped for from paid appointees?"**

On this basis, backed by observations of the actual experiences in the thirty or more states which have forestry departments, the American Forestry Association is vigorously opposing the proposed consolidation of forestry with other state departments, especially in Minnesota, Indiana and Vermont, which are now before the legislatures of those states. True economy and efficiency in state departments does not consist of eliminating the boards of directors for important state enterprises, boards of men carefully selected and appointed without salary to supervise the work in the public interest and to substitute therefor a single high-salaried appointee, who, unless all precedents fail, must inevitably be more or less influenced by the system of party spoils to which he owes his office.

If what we have is good, let us hold fast to it, and by demanding cause for every change proposed, force the movement for consolidation to proceed along lines which will safeguard and improve the public welfare, instead of plunging the entire fabric of the state machinery into a political abyss from which it may take a generation to recover.

INCREASING THE GRAZING FEES ON NATIONAL FORESTS

THE growing efficiency with which national property in the West is being administered is nowhere more strikingly shown than in handling the grazing business on the National Forests and Indian Reservations. The policy of charging fees for grazing, inaugurated by the Forest Service in 1905, was later adopted by the Department of the Interior on the reservations, but was never extended to the public lands.

Grazing privileges on Indian lands are auctioned to the highest bidder under sealed bids on five-year contracts. In this way the market value of the grazing is actually secured. But the system inevitably leads to few and large units, controlled by the larger and wealthier organizations or individuals. The method brings in the maximum revenue to the Indian funds at least expense for administration.

The Forest Service has pursued a different policy. Not having the Indians as their sole beneficiary, they were guided by the principle of the greatest good to the greatest number. In contrast to Indian Reservations, National Forests are opened to settlement wherever agricultural lands are found within their boundaries. One of the chief sources of income for the homesteader is grazing. But he has at most but a few head of stock, and his chances in the free-for-all scramble on the public range are very poor. A policy of large units, auctioned grazing privileges and fencing would inevitably freeze out the small man on National Forests.

To prevent this, the Forest Service created preferential rights in favor of the settler and home-builder. Ten head of stock are grazed free. The remaining carrying capacity is distributed, first to the settler and what is left goes to the stockmen with larger herds or flocks. Grazing permits are for one year, and, to make room for new homesteaders, the number of stock grazed on a permit may be reduced, this reduction to fall on the larger permittees. Under this system, the Forest Service now issues 33,300 separate grazing permits.

Meanwhile, the grazing privilege became more valuable for many well-known causes, chief of which were the growing scarcity of free range and the higher price of meat. The prices received for grazing on Indian, state, railroad and private lands rose accordingly—the fees charged on National Forests remained stationary. Finally, the discrepancy became too great to be further tolerated and the Service gave notice of an increase, which in three years' time would double the present scale of charges.

The various livestock associations uniformly protested against this increase, but the stockmen were united

in support of the system, at the established rates! To quote from a pamphlet recently issued by a stockman in Arizona:

"The Forest Service have promulgated and have now in force a regulated system of grazing on their Forests of which they may justly be proud, covering an almost unbelievable range of conditions as wide as this great country itself.

"The stockmen do not fear, but favor the regulation of their business based upon fairness and the greatest good to the greatest number."

But they quite naturally desired to secure these privileges at as low a cost as possible, and if protests would accomplish this, they were going to protest.

So long as exclusive fenced units are denied, and the gateway of opportunity held open for new permittees, National Forest grazing privileges are not worth as much per head as Indian or private grazing. But the Forest Service should not permit unfair privileges by allowing grazing on these Forests at less than real value. Not only is the Government at present meeting an annual deficit of over \$2,000,000 in administration while the stockmen get grazing for half what it is worth, but the states, through their county, school and road funds, lose 35 per cent of the gross revenue which they should receive from this source in lieu of taxes on the grazing lands.

The result of this agitation was not all that the friends of the National Forest Administration could wish. In spite of the testimony of the grazing experts of the Forest Service, the Department of Agriculture, after a final hearing, reduced its proposed increase from 33 $\frac{1}{3}$ to 25 per cent, and declared that further increases should be contingent upon future investigations of the actual value of the grazing privileges on each separate forest. Encouraged by this success, the agitation against these normal increases is bound to continue in full force.

In these contests between interests which have special privileges to defend, and the public, it too often happens that the special users are well organized and ably represented, and that the interests of the general public do not receive as vigorous and adequate a presentation as they should. The American Forestry Association desires to see such of our national resources as are retained in public ownership administered in absolute fairness to the user. But in a competitive commercial business such as grazing, or timber sales, justice, both to the public and to other individuals in the same business, demands that forage as well as timber be sold for as nearly as possible what it is actually worth.

CONSERVATION of life and limb in the lumber industry is said to be one of the biggest problems now confronting the nation's lumbermen. Habitual carelessness is reported responsible for ninety per cent of all industrial accidents, and the subsequent condition of the injured, involving lost time, lost faculties, and even loss of life, depends on proper attention the first few minutes after an accident, pending the arrival of a physician.

OFFICIALS of the Pennsylvania Department of Forestry are much encouraged by the replies received to a circular letter on reforestation, addressed several weeks ago to all the water companies in the state. To date, ninety-five water companies have written to the Department stating that they are interested in restoring tree cover to the hills on their watersheds, and applications are listed for over 100,000 trees to be used for this purpose.

Forest Fire-bugs Prosecuted

Setting forest fires in Pennsylvania is no longer the pleasant pastime it used to be. Since the legislature of 1915 put teeth into the forest fire law and provided for the establishment of a bureau of forest protection within the Department of Forestry, more prosecutions and investigations in connection with forest fires have been started than in all the previous years since the creation of the Department. In all, thirty-six cases were referred to the Attorney General's Department by the Commissioner of Forestry during the past year. Legal action was authorized in nineteen of these cases. Four convictions have been secured to date, thirteen cases are still pending, and there have been but two acquittals. In several additional cases criminal action was not directed by the Attorney General because of the extreme poverty of the defendants and the absence of evidence of criminal intent in setting forest fires.

Red-rot in Arizona and New Mexico

A recent survey of the forests in Arizona and New Mexico, conducted by the United States Department of Agriculture, indicates that the existence of what is known as Western red-rot causes a considerable amount of loss to lumbermen in these states each year. It is said that the percentage of trees found to be infected with this disease varies. No external signs were found which could be relied upon to inform the observer whether or not a given tree was attacked by the disease. It was found, however, that trees growing on very thin soils on steep south or east slopes where growth conditions are poor, appear to be more likely to have the disease than pine situated where growth conditions are good.

Furthermore, it was ascertained that the disease was much more prevalent among the mature yellow pines than among the younger trees or black jacks. Any system of cutting, says the new publication, that will take out most of the older trees (yellow pine) and many of the larger black jacks, as well as all suppressed trees, will do much to rid the future forests of this serious heart-rot. From this point of view, a short rotation is better for the future health of the forest than a longer one.

Tree Service for Houston

The Public Parks Department of the City of Houston, Texas, is rapidly awakening to the need of more trees and of better tree service for the city. The result is that many trees are being planted, not only in the parks but on the streets and boulevards. This city recently planted one vista in the new Hermann Park with a bordering of Bald Cypress (*Taxodium distichum*). The planting required 415 Bald Cypress, ranging in

size from 5 to 16 feet and from one inch to two and a half inch caliper. A plantation of this kind of tree, even in the South, is somewhat unusual.

The Parks Department is now receiving 500 live oaks, 1 inch caliper, 5 to 7 feet, and 1½ inch caliper, 7 to 9 feet, which are being planted in a double tree line on the new Main Boulevard along the Hermann Park front. The Board of Park Commissioners decreed that nothing but live oaks should be used for the entire length of this boulevard, and this action has caused a greater activity in the planting of trees on this boulevard.

During May, June and July, 1916, more than 200 large oak trees were moved back, to allow a widening of this boulevard and up to the present time less than 5 per cent of these trees have died, though they were removed at an unseasonable time, and it is considered somewhat remarkable that so many of them have lived.

The Public Parks Department of the city has recently started a nursery, in which will be grown all the trees, shrubs and plants that will be used in all the parks in the city, including the new Exposition grounds. A city tree warden will be appointed this year to care for all of the trees under the direction of Park Superintendent C. L. Brock, and steps will immediately be taken to map and index every street in the city, showing all trees.

Forests as Playgrounds

Devoting much space to the importance of National Forests as playgrounds, *The Railroad Red Book* for January has special articles with several pictures by Smith Riley, district forester, U. S. Forest Service, W. B. Fraser, state game and fish commissioner of Colorado, and T. J. Ehrhart, state highway commissioner. In the article on National Forest playgrounds accessible by the Denver & Rio Grande railroad, Mr. Riley writes:

"The popularity of the National Forests as summer playgrounds is increasing by leaps and bounds each year. These vacation wonderlands were visited by over 2,000,000 people in 1916. Of this number Colorado received 605,000 or 30 per cent of the total."

Hunters Get 618 Bucks

Six hundred and eighteen deer, 549 turkeys, 37 bears, 1084 coyotes, 117 wolves, and 48 mountain lions were killed by hunters in the New Mexico National Forests during the season just passed, according to the District Forester's annual report on game conditions just submitted to the State Game Warden.

"The number of deer killed is 5 per cent less than in 1915, 4 per cent less than in 1914, and 7 per cent less than in 1913," says

District Forester Redington. "It is safe to assume that the number of hunters has increased. It would seem, therefore, that these figures indicate a steady decrease in the supply of deer. The number of turkeys killed also shows a decrease as compared with 1915. Some people still believe that the game protectionists are alarmists, but these figures speak for themselves, and to the contrary. They emphasize the need for game refuges, better laws, and above all better law enforcement."

The report shows that the number of predatory animals killed has more than doubled as compared with 1915. Forest officers attribute this to the work of the Government trappers employed by the United States Biological Survey, and regard it as about the only encouraging feature of the report.

BOOK REVIEWS

The latest publication of the Bureau of Forestry of the Philippine Islands, Bulletin 14, entitled "Commercial Woods of the Philippines: Their Preparation and Uses," is just out. This is by far the most comprehensive work so far published on the subject and, from the point of view of the wood-user, also the most practical. The book consists of five parts dealing with different phases of the subject. Part I is a concise description of the forests and of lumbering conditions in the Islands; Part II, a discussion in popular language of the physical and mechanical properties and the structure of wood; Part III, a very comprehensive discussion of uses, the different purposes to which wood is put being arranged in alphabetical order, with frequent cross-references; Part IV gives, also in the least possible technical form, directions for the identification of wood; and Part V, which occupies more than half of the book, gives detailed descriptions of about 360 Philippine woods, with notes on their mechanical properties and workability, their distribution in the Islands, local names, uses, supply and approximate prices. There is also a general index, one of scientific names and one of all the official, commercial and local names.

Lumberjack Bob, by Lewis H. Theiss. W. A. Wilde Company, Boston, Massachusetts. \$1.25.

This is a book which describes the experiences and the adventures of a young lumberman and forester in the woods, and, with a style of narrative which carries the reader along in a manner which sustains the interest throughout, manages to convey lesson after lesson of the trees and the woods. It is enticing to young people as well as adults, and instructive to both. The author is to be complimented upon his ability in presenting so much valuable information in so attractive a manner.

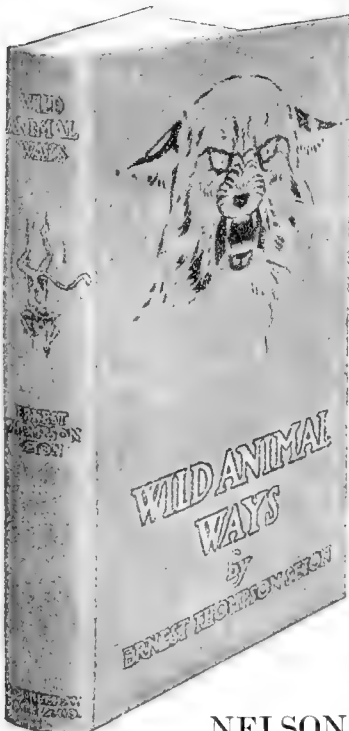


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CANADIAN DEPARTMENT

ELLWOOD WILSON

SECRETARY, CANADIAN SOCIETY OF FOREST ENGINEERS

The recent meeting of the Canadian Forestry Association in Ottawa was a very successful one. The chief topics of discussion were the white pine blister rust and the proper disposal of debris left by logging operations. The inroads the blister rust is known to have made have not been extensive, but further examination may show other affected areas, especially on the south shore of the St. Lawrence River, near the northern boundaries of New Hampshire and Vermont. The main areas at present affected are the Niagara Peninsula, the Trappist Plantation of pine at Oka and a small area near Montreal. None of these is threatening from the standpoint of merchantable white pine, but must be watched to prevent the spread into the forests. A resolution was passed asking the Dominion and Provincial Governments to make the necessary appropriations for scouting and prevention. The question of the disposal of logging debris came up for discussion and it was pretty generally conceded that burning is the best method and that it is very important from the standpoint of fire protection and protection from insects. The Dominion Entomologist says that the logging debris is one of the best breeding grounds for insects. A committee was appointed to study these matters thoroughly and to report later. The same committee will take up the question of the introduction of civil service regulations in the outside service of the Dominion Forestry Branch and the Forestry Branches of the Provincial Governments which have not already been put on that basis. The banquet held in the evening was a very successful and enjoyable one and the speeches were better than the year previous.

At the meeting of the Commission of Conservation questions of general interest were discussed, including agriculture, fisheries and forests—the proper planning of towns and cities. This latter subject is one of the most important of the activities of the Commission and does not mean simply the making of ground plans for cities, but the proper planning for all the activities which make up the life of the community. Proper location of manufacturing and residential quarters, parks, playgrounds, etc., in accordance with the topography of the site selected and for the greatest efficiency of community life. Planning for proper drainage, streets, water-works and power and light lines. The work also covers villages and farming sections so that the agricultural population will have proper roads and that the farms will be laid out to give the right proportion and location of arable land, pasture and woodlots and will have accessible schools, churches and railway stations. All over the country the sole reason for the lay-out of

our towns and cities and farms seems to have been to make it easy for the surveyor. No one seems to have used any imagination or foresight.

Several very important recommendations in regard to necessary forestry work were made by the Commission: that the Government of New Brunswick should consolidate its present forestry and fire protection work under a central organization with properly trained staff; that Ontario should endeavor to organize cooperative fire protective associations to work with its fire protection Branch; that Quebec should take better measures for the protection of its forest lands not yet under license; that Nova Scotia should appoint a trained Forester; that British Columbia should start a forest school; that the Dominion Government should put into force proper forestry regulations in connection with cutting operations on licensed timber berths, with a view to ensuring the perpetuation of the forest; and that both Dominion and Provincial Governments should put into force regulations which will place their forestry and fire protection systems on the basis of appointments and promotions for merit only.

The report of the Commission of Conservation upon the investigation of the forest resources of British Columbia is nearly completed and will soon be ready for publication and also the report upon the forest resources of Saskatchewan. An investigation of the condition of cut-over pulpwood lands, the timber left, the increased growth after the thinning of the stands, the amount of the probable future cut after periods of years and other matters in connection therewith will be undertaken during the coming summer in cooperation with the Laurentide Company, Limited, and the Canadian Pulp and Paper Association.

There is a great necessity for the foundation of a really good ranger school in Canada. We have enough schools to turn out trained foresters, but there are no men who can fill the places of rangers acceptably—every forester must train his own. The teaching in such a school should be eminently practical and should aim at giving the class of men who work in the woods the theory of elementary surveying, forest mensuration, English and French, simple accounting and mathematics. They should also be trained in woodcraft. This sounds strange, but it is a fact that men who have lived and worked in the woods all their lives are strangely deficient in some branches of this art and in trained observation. They have many superstitions.

The Annual Meeting of the full Pulp and Paper Association and of the Technical Section in Montreal was most successful. The reports of the various sections showed

much work accomplished during the year past and much benefit from cooperation and the exchange of ideas. Especial interest was shown in forestry matters and some work will be done along this line during the coming year. At the luncheon, Sir George Foster, Minister of Trade and Commerce, made a most excellent speech in which he told the members that trade after the war would be large and would require that they prepare early for it and cooperate in handling it. He also said that while the surplus of exports over imports was very large now owing to war conditions, after the war it would drop back and with our heavy war debt we must work hard and increase production and export so as to make the balance of trade in our favor.

On February first and second at the Windsor Hotel in Montreal was held the first Forest Protection Conference ever held in Eastern Canada. All phases of forest protection were discussed, from fire, from insects and from fungi. The white pine blister rust came in for much discussion. The problem of slash burning as a fire preventive measure and also as a means of preventing insects from increasing was touched upon and different views brought out. The use of aeroplanes for discovering and locating forest fires and the use of telephones in reporting them and summoning aid were interestingly presented. The development of mechanical aids to fire fighting was shown and much interest was excited by the Johnson portable gasoline combined engine and pump, weighing only about 150 pounds. This pump was in use during the past season by the Dominion Parks Branch and the St. Maurice Forest Protective Association and did splendid service in checking fires which would have otherwise required large crews of men to prevent from spreading and so saved large sums of money which would have been spent in fire fighting.

M. Allerdale Grainger, for the past two years acting chief forester, has recently been gazetted upon his appointment as chief forester, in succession to H. R. MacMillan.

Dr. W. W. Walkem, in an article appearing in a recent issue of the *Vancouver Daily Province*, gives a striking instance of the durability of Douglas Fir. In the course of some excavation work between Vancouver and New Westminster, a Douglas Fir several feet in diameter was found buried under twenty feet of water-washed gravel and sand, overlying glacial-worn rocks and moraine, presumably contemporaneous with the glacial period. The tree had to be cross-cut twice to permit the passage of the steam shovel, and the wood was found to be perfectly sound. On the surface were other fir trees growing which were many centuries old.

FOUR COLONIAL HOUSES

BY RAWSON WOODMAN HADDON

THE way by which we may preserve in the domestic architecture of today an undefinable charm—a certain warmth of personality with which American history has invested the wooden house—is what Mr. Joy Wheeler Dow shows us in the buildings he has designed, and in his writings upon the various developments of American architecture, both historic and modern.

To secure this charm—to build a certain amount of convincing historical atmosphere into the house without losing any of the comforts that we have learned to expect in houses of today, and still preserve the splendid qualities of the original Colonial building, is the especial task that this architect has set for himself. How well he succeeds and by what means, we shall see.

In the very first place materials must be selected with care and with a full knowledge of the possibilities of every

with it an authoritativeness recognized by architects and homebuilders alike.

For this reason it is interesting to know that he says, in connection with the selection of materials for the new house, that "if we go further, and by means of accumulated affluence erect the entire structure of the new colonial house in stone—columns, cornices, window and door casings, etc., strange to say we lose an undefinable charm—a certain warmth and personality with which American history has invested wood."

Undoubtedly we do. And the loss is not owing simply to the fact that we have failed to use wood where our forefathers used it, but it is because the wood we have not used has been tried and found since the earliest days of American building to be the ideal building material in



"KEEPSAKE," AT MARQUETTE, MICHIGAN



THE BISHOP HOUSE, NORWALK, CONNECTICUT



THE SWARTZ HOUSE, NORWALK, CONNECTICUT

available source of supply. In the present instance, in addition to being an architect of wide experience, the designer of the houses here illustrated is the author of "The American Renaissance," one of the best-known books on American architecture, and his word, both in his books and as exemplified in the houses he has designed, carries

this country for reasons of looks, and because of its comparatively low cost and plentiful supply, and for economy of maintenance and repair.

"Keepsake" at Marquette, Michigan, has been known—since it was built in 1913—as one of the most successful buildings yet erected which is based on the

Colonial house of the earliest type. It reproduces the general characteristics of the houses built during the days of Hawthorne's "Scarlet Letter." It fairly breathes the spirit of Salem witchcraft days, and "Colonial governors who sheltered the regicides, or indeed Whalley



FRONT VIEW, "WITCHWOOD," HIGHLAND MILLS, NEW YORK

and Goffe themselves, might for all we know"—save that the house is not quite five years old—have found refuge in it.

The means taken to secure this family resemblance to houses of two and a half centuries ago were neither costly nor complicated. In the first place the exterior clapboards, which are cypress, have never been painted. After the completion of the work, they were simply oiled to preserve the wood and to bring out its fine natural color.

On the side of the house it will be noticed that the clapboards in the gable are wider than those below. The upper ones are eight inches wide and the lower ones are four. These lower boards are beaded, or moulded, on the lower side, as most early siding was.

On the whole, no tricks or "stunts" of design were attempted and the building from top to bottom was simply patterned after the usual manner of early work. An overhang at the second floor (see page 181) is designed as all old ones were. The windows in the first floor rooms are brought high up in the room and well under this overhang, and at the second floor the windows are near the cornice. The brackets under the overhang were carefully designed after the study

of many historic examples, and a typical chimney, large enough to accommodate many large fireplaces, was used.

The construction inside "Keepsake" is the same as that found in the old houses of Salem and other New England towns. And yet, remarkable enough, the cost of this house, with all its good design and construction, was not as great as that of the poorly built and still more



DETAIL OF THE PORCH AT "WITCHWOOD"

poorly designed "Colonial" houses found in every suburb and small (and large, too, for that matter) city or town. Its cost, at a time however when labor and materials were less expensive than they are at present, was \$6000.

Another successful example of early design is "Witchwood" at Highland Mills, New York. In this instance the building might have been put up as late as 1700, or in the "Middle Period" as architectural historians call it. The doorway is an unusually successful one of its kind, and the treatment of the porch at the side of the house is well worth study—and reproduction on houses that make no pretence of being Colonial.

The Bishop house at Norwalk, Connecticut, is an example of a later type. The roof is reminiscent of those found in certain parts of the South. The sides of this house are covered with hand-riven white pine shingles laid nine inches to the weather. Both here and at the Swartz house the roof shingles are cypress. The interior trim of both is white wood, painted, and the floors are oak. In the Swartz house the stairs are oak and the handrail is mahogany. The Swartz house, built in 1907, cost \$12,000, and the Bishop house which was built a year earlier cost \$11,000.



FIRE-PLACE AT "WITCHWOOD." THE CANDLE-STICKS, MUGS AND THE CHAIR ARE UNFORTUNATE; NONE ARE COLONIAL

(Continued from page 182)

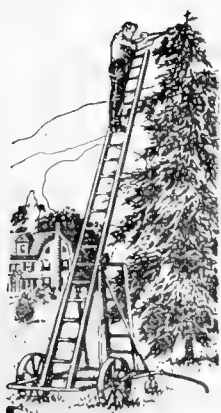
Correct design, of course, and strict attention to historic examples, are the things that make the new Colonial house a success or a failure. And also, as has already been said, the materials used in the building must be selected with the greatest care.

"In English Renaissance," says the architect, "local conditions commonly restricted the use of wood to the interiors. In American Renaissance (that in our own Colonial style) the plentitude of this material enabled the Colonial builders to use it for the outside as well, and with great advantage, for it permitted the Colonist to elaborate the elevations of his dwelling, gaining thereby warmth, cheerfulness and grace, and all easily within his means. Without the slightest danger of bankruptcy he could proceed to embellish the curtilage with arched gateways, ornamental fences, terrace rails and summer-houses *ad lib.*"

No wonder then that in early American villages are found so many splendid houses (large or small) that have remained to this day as a model after which the houses of our own time may be patterned, with, however, it is sad to say, sometimes but indifferent success. And no wonder, in view of this realization of the faith that earlier designers had in wood, that practically all of Mr. Dow's most successful houses have been built of that material. And quite naturally of wood, too, for "there was no bit of classic detail from either Athens or Rome transmitted to London" (and from there to America where the Georgian architecture of England became, in course of translation or transplantation, the Colonial architecture of New England) "through what I may call the 'Florentine Clearing-house' presided over by Palladio, Sansovino, Scammozzi and their contemporaries, but what would be carved more readily in wood; and time and history have thrown a glamour over all this wooden development of ours and established its right of succession with a hall-mark."

Blasting Tree Holes

"I recently visited Prof. C. B. Waller, Instructor in Chemistry at Wofford College, Spartanburg, South Carolina, writes J. C. Ahl, "I found him to be an enthusiastic advocate of dynamite for blasting tree holes. It seems that recently he planted fifty pecan trees in some hard clay soil. He had read something about the advantages of using dynamite in tree planting and decided to try it. The orchard site was laid out in sections. At each intersecting point, a bore hole was put down to a depth of about thirty inches, each hole being charged with a quarter of a pound of 20 per cent dynamite. When these holes were dug out just before planting the trees, it was found that the blasting had shattered the hardpan very nicely. The blasting also saved a good deal of time and much hard work. The use of dynamite for tree planting is becoming very general all through this section of the state."



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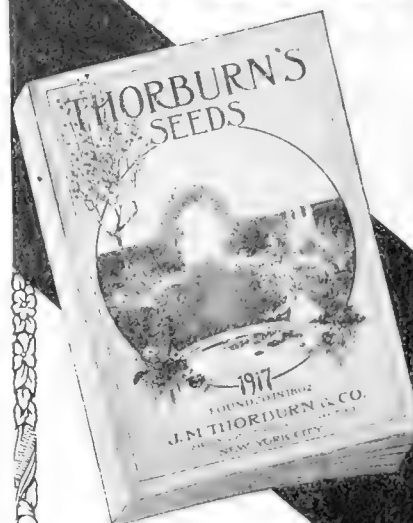
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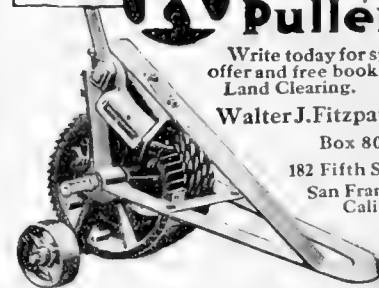
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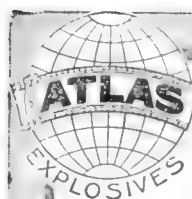
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IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

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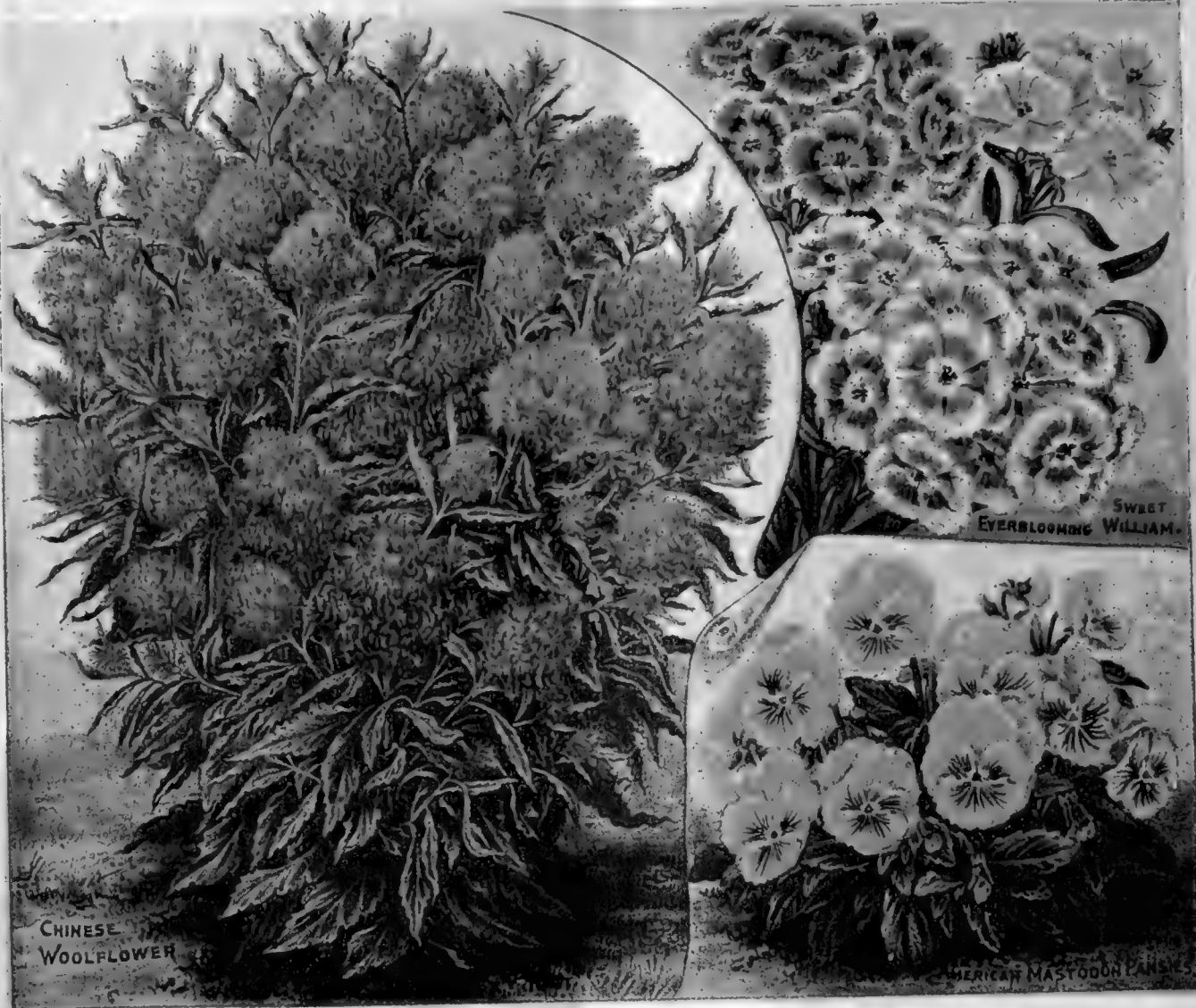
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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal cooperation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by cooperation; without adequate fire protection all other measures for forest crop production will fail.

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THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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APRIL 1917 VOL. 23

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Subscription price without membership, three dollars per year; single copies, twenty-five cents.

Entered as second-class mail matter December 24, 1909, at the Post-office at Washington, under the Act of March 3, 1879

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AMERICAN FORESTRY

VOL. XXIII

APRIL 1917

NO. 280

PLANTING ONE MILLION FOOD GARDENS

IN the existing national emergency the American Forestry Association is "doing its bit." Realizing that the most important feature of economic preparedness is to provide a sufficient food supply, and knowing that owing to the demands from abroad, transportation difficulties at home, and a crop shortage last year there was an actual deficiency in the food supply, the Association has lent the aid of its Conservation Department, its headquarters, and its secretary to the National Emergency Food Garden Commission. This Commission, of which Mr. Charles Lathrop Pack is the president, is for one thing inspiring and aiding the planting of 1,000,000 food gardens in cities, towns and villages. The product of these gardens will supply more than 1,000,000 families, and be valued at \$250,000,000. The members of the American Forestry Association are asked to give their approval and their active assistance in furthering this movement and adding to its success.

THE country's food supply is less than the country's need for home consumption and for export. Something must be done to increase it, and a plan, feasible, rational, simple, has been worked out and given to the people through the newly created National Emergency Food Garden Commission, affiliated with the Conservation Department of the American Forestry Association, which may mean the adding of \$250,000,000 to the annual food supply of the nation. It will mean also the creation and tilling of a million more vegetable-producing gardens in the back yards of thousands of towns, villages and cities of the nation, the utilization of vacant lots and idle land, and the creation of a condition which will enable the civilian population to be helpful to the military arms of the nation.

Charles Lathrop Pack, of Lakewood, New Jersey, president of the American Forestry Association, has been made the president of the National Emergency Food Garden Commission. He is the originator of the Commission and of the idea of a nation-wide campaign for the production of home-grown vegetables. He found upon investigation that there are hundreds of thousands of acres of vacant and untilled lots, neglected back yards, and idle, tillable land accessible to those who might wish to utilize it. He found further that the food supply of the nation was dwindling, that prices for the necessities of life were soaring and destined for still greater altitudes; that if war gripped the nation the great railroad systems would be commissioned for troop and military supply movements, that the products of the farm and stock from the ranch would have difficulty in finding an outlet and that a considerable portion of all foodstuffs would be required for the fighting forces.

Mr. Pack conceived the idea that the home garden, the back lot garden, as an adjunct to the school garden, would

solve the problem. He conferred with eminent men—leaders of thought—and they agreed unanimously that the back yard movement was the solution of the problem, and the National Emergency Food Garden Commission was created.

It was at once affiliated with the Conservation Department of the American Forestry Association, which lent its headquarters and business organization to the work.

The main feature of this work is to supply thousands of newspapers with articles inspiring the planting of food gardens and with a daily service of practical advice on the making and the care of these gardens, the selection of seeds and the cultivation of the vegetables. By this means an average of 10,000,000 people are supplied with daily information for every 1,000 newspapers printing the information. At this time some 2,000 papers are printing the information, which thus becomes available for 20,000,000 people to whom back yards, school gardens or vacant lots are accessible.

Percival S. Ridsdale, secretary of the American Forestry Association and editor of AMERICAN FORESTRY, was chosen as secretary of the Commission. The other members of the Commission are Luther Burbank, perhaps the most noted horticulturist in the world, Dr. Charles W. Eliot, of Cambridge, Massachusetts; John Hays Hammond, the noted mining engineer; Fairfax Harrison, president of the Southern Railway; Dr. John Grier Hibben, president of Princeton; Dr. Irving Fisher, of Yale; Emerson McMillin, of New York; A. W. Shaw, of Chicago; assistant secretary of agriculture, Carl Vrooman; Captain J. B. White, noted lumberman and conservationist and now a member of the United States Shipping Board; James Wilson, former secretary of agriculture, and Hon. Myron T. Herrick, of Ohio. In this list of men of action may be found the foremost thinkers of America. They are men

THE NATIONAL EMERGENCY FOOD GARDEN COMMISSION

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DR. CHARLES W. ELIOT, <i>Mass.</i>	EMERSON McMILLIN, <i>N. Y.</i>
DR. IRVING FISHER, <i>Conn.</i>	CHARLES LATHROP PACK, <i>N. J.</i>
JOHN HAYS HAMMOND, <i>Mass.</i>	A. W. SHAW, <i>Ill.</i>
FAIRFAX HARRISON, <i>Va.</i>	HON. CARL VROOMAN, <i>Ill.</i>
HON. MYRON T. HERRICK, <i>Ohio</i>	CAPT. J. B. WHITE, <i>Mo.</i>
HON. JAMES WILSON, <i>Iowa</i>	



A FOOD GARDEN IN A SMALL TOWN

Here are the back yards, with side fences torn out, thrown together to make one large garden in order to make possible the use of labor-saving machinery. Thus the whole tract was plowed, which saved much laborious spading, and when the crops were made, a horse cultivator was employed, all these operations being paid for out of a joint fund provided by the gardeners. Operations on such a scale are impossible in the more crowded cities, but the picture shows the productivity of food gardens.

who have devoted their lives to the solving of vital problems and whose aim through life has been to master some one given profession that their knowledge might reflect good upon their fellows.

The Commission, immediately following the organization, took up the work of spreading the gospel of food preparedness. Mayors of towns and cities, boards of trade, newspapers and other publications were appealed to and within a remarkably short time the campaign caught the hearty support of the nation as a whole. Mayors of scores of cities have wired the Washington headquarters of the Commission that they have entered the campaign, and in many cities central bodies have been organized to correlate efforts toward successful gardening and to put these efforts on a systematic basis.

Public-spirited men and women are serving on the central bodies, and all over the country city councils, chambers of commerce, boards of trade, mothers' clubs, citizens' associations, boy scouts, girl scouts, and playground associations have taken up the business of actually getting the nation into condition where it may cease to tremble for food.

Thus has been laid a foundation upon which may be built the future self-sustaining agricultural policy of every American household.

School gardens of course have been maintained in certain communities for years, but the home garden as an adjunct, or rather its significance as a social, an educational, and an absolutely and positively necessary factor, is just beginning to be appreciated by the nation. In most cities



LET'S HAVE 1,000,000 OF THESE

Here is the ideal back yard as seen by the National Emergency Food Garden Commission. It is cabbages, beets, and turnips in trim, fertile rows instead of lawn, and, as is more likely, unsightly sheds, ashes, tin cans, and rubbish heaps. Give us enough back yards like this and the cost of living will have no terrors for Americans.



AMERICA'S MAN WITH THE HOE—1917

This American man with the hoe happens to be wielding a rake tidying up the paths in a community garden, and his age happens to be 11 years, but nevertheless, in this time of short food supplies and fearful prices, he may be the hope of the nation. There are 4,000,000 graded school children in the United States. Put them all to work in gardens and America's food problem would be solved.



CABBAGES AND KINGS

Some years ago the Walrus got a big laugh with that line, because kings then were so much more important than cabbages. This year kings are a drug on the market while cabbages by the ton bring about the same price as gold ore. If America is to have enough cabbages and other vegetables this year, men, women, and children must turn to and raise them in town and city home gardens.

there are hundreds of acres of land in the form of back yards and vacant lots that might profitably be used for the production of food necessities. In these same cities there are thousands of boys and girls who, with proper guidance, would be willing to utilize this non-productive land. Furthermore, now that the Commission has enthused the nation, these same cities no longer will be importing yearly thousands of dollars' worth of vegetables, but will be raising foodstuffs themselves.

Considering the low average labor income, the amount spent for fresh vegetable and small fruit foods is large, an average outside of large cities of \$138 per year for a family of five persons. About thirty per cent of such families have home or vacant-lot vegetable gardens, but the method of planting and cultivation are not intensive, and the money value of the product is small. But this condition, which existed during the past

THE FOOD CRISIS

BY CHARLES LATHROP PACK

President of the National Emergency Food Garden Commission and
President of the American Forestry Association

THE National Emergency Food Garden Commission aims to assist in making food more plentiful in villages, towns and cities by inspiring the planting of food gardens this year. This is a measure of economic preparedness of vital importance. It will release, in case of military necessity, the use of thousands of trains otherwise required to carry food; it will relieve transportation difficulties which even now cause a deficiency in food supplies; it will reduce the high cost of living.

Hundreds of thousands of individuals, thousands of organizations, would raise vegetables in home gardens, school gardens and vacant lots if they were aroused and if they knew how. The National Emergency Food Garden Commission will arouse them and will tell them how. It has secured the coöperation of hundreds of newspapers which will publish daily instruction and advice on when and how and what to plant. It is being assisted by thousands of city and town officials, civic bodies and planting organizations.

We face a national emergency—a food deficiency. The way to meet and overcome it is by enlisting our boys and girls and men and women to plant vegetables on any plot of ground available.

European nations cannot supply their own needs for food—they must buy from the United States. This buying depletes our own supply. Crops were short last year and the year before. Scarcity of labor will make them short this year. The problem is serious. Patriotic Americans wish to help their country. They can best help by relieving the government of this food problem. They can solve this economic crisis and benefit themselves financially and physically by planting food gardens.

Patriotic words are empty air. Patriotic acts alone will help. Plant a food garden and do your part towards the economic victory.

We expect to induce more than one million young people, women and elderly men this year to plant a food garden who have not done so before. This alone should add much more than two hundred and fifty million dollars to the food value of this season's crop. Those who have made such gardens before should increase their efforts.

You are anxious to do something patriotic because you feel that way. You want to help your country. You can plant a vegetable food garden. Are you doing so? Start now.

several years, now will be overcome when it is realized that the need of intensive food gardening is knocking at the door of nearly every home in America.

In twenty of the important cities of the country last year the public school officials, recognizing the importance of the gardening idea, voted appropriations to carry on the work. Philadelphia spent nearly \$20,000; Los Angeles, California, \$19,000; Cincinnati, \$8,000; Pittsburgh, \$7,000; Kansas City, \$5,000; Chicago, \$4,000; St. Paul, \$3,500. Other cities included in the list, and which spent \$1,000 or more in the work, were Portland, Oregon; Crockett, Texas; Cleveland, Ohio; Birmingham, Alabama; Brockton, Massachusetts; Framingham, Massachusetts; Hartford, Connecticut; Marshall, Texas; Milton, Massachusetts; Pasadena, California; Marlin, Texas; Minneapolis, Minnesota; Tampa, Florida.

Minneapolis, since the Garden Commission began its work of education, is at



OUT WHERE UNCLE JOE LIVES

The Darnall boys, Gene and Jack, who are neighbors of the Honorable Joseph Gurney Cannon in Danville, Illinois, and know him familiarly as Uncle Joe, have gone in exclusively for corn in their joint garden, thereby setting at defiance a precept of scientific farming which prescribes mixed crops. However, Gene and Jack seem to be doing well with their corn, which is to be expected in the corn belt. The Civic Federation of Danville is behind the gardening movement in that city. This year many other civic organizations are aiding the home gardeners.

the forefront of the food preparedness campaign with a new method of stimulating interest in the work. Three thousand vacant lots, in addition to back yard gardens, are to be tilled by individuals in the Minnesota city. At the end of summer, after all the gardens have been harvested, a crop festival will be held to which every amateur gardener will be asked to bring specimens of the product he has raised. Prizes and blue ribbons will be offered for the best samples shown. Several other cities are to take up the Minneapolis plan which is expected to develop the same spirit of rivalry among vacant lot and back yard tillers which exists in farming communities through the medium of the county fair.

As a concrete example of what may be accomplished



JACK AND THE BEAN STALK

Jack's name is Mike—last name Kelly—and his curly hair is red. From which it may be gathered that his nature is energetic. Private affairs took him away from his bean stalks so much last year that from an investment of \$4.68 his food garden produced only \$18.56. His next-door neighbor in the school garden tract—a girl, too—profited so much by Mike's horrible example that she made one of the best gardens in town.

through home gardening, the National Emergency Food Garden Commission points out that, for instance, in Chattanooga, Tennessee, in the summer of 1914, nearly five hundred school children tilled 12 acres in back yards, growing \$2,500 worth of vegetables in the three summer months. In the summer of 1916, 718 pupils tilled 13 acres in back yards, and the vegetables grown aggregated in value \$3,786. In Charlotte, North Carolina, 168 children tilled 7 acres and produced \$1,225 worth of vegetables. In Asheville, the same state, school authorities prevailed upon the children to follow similar pursuits, with the result that the little folk produced considerable food-stuffs. So it has been in Raleigh and Lexington, North Carolina; in Augusta and Atlanta, Georgia;



in Lexington, Kentucky; Chester, Pennsylvania; Wilmington, Delaware; Georgetown, and in Michigan, South Dakota, Ohio and other states and cities the movement has made its impress on the minds of the thinking people.

The Commission which has aroused the nation to the realization that millions may be saved annually through the employment of agencies which in the past have been neglected, feels that the future of American agriculture is largely dependent on the boys and girls of today, and it is the purpose of this institution



MAKING DAME NATURE HURRY

With a saw, a hammer and an empty grape juice box, this boy has the equipment which will vie in effectiveness with the expensive hot beds and forcing frames of the scientific market gardener. From the deep box he makes three shallow seed boxes, bores holes in their bottoms for drainage, fills them with rich earth, and plants good seed. Then, if he sets the boxes in south windows of his house, by the time the spring sun warms the outdoor soil he will have thriving tomato plants for his garden.

to assist the other forces now at work to interest, instruct, and direct the youth of the country in the possibilities of garden raising as a profitable and dignified pursuit.

The Commission does not undertake to make an accurate estimate of the value of crops grown in the food gardens of the United States, but from careful investigation it is enabled to say that a well-kept garden will yield a return ten to fifteen times greater than would the same area and location if devoted to general farm crops. A little work and a little land will easily



THE COÖPERATIVE GARDEN

Here in a Massachusetts town we see the neighborhood cooperating in a garden, the cheapest and easiest plan. Cooperative funds paid for the plowing and fertilizing of the lot and then the individuals planted whatever they chose and took care of their own crops. The National Emergency Food Garden Commission is calling this plan to the attention of apartment house dwellers who can have access to large vacant lots.



HELPING OUT IN THE LIVING PROBLEM

This boy has a task better for himself and more profitable than selling newspapers to help out his father's weekly pay envelope. His garden, on land the use of which he got for the asking, is the pleasantest spot in this dreary street of workmen's houses, and the most productive, for it furnishes the vegetables which his hard-working mother would have to buy at high prices or go without.



A BOUNTIFUL HEDGE

In the smaller town, where lots are broad and deep and vacant property plentiful the larger garden is advised by the National Emergency Food Garden Commission. The family living on this beautiful, shady street has a garden which provides its every food need so far as fresh vegetables are concerned. The details of this garden are concealed from the street by a hedgerow of corn, which not only is pleasing to the eye but produces luscious ears of green corn.

supply a family with \$100 worth of vegetables during the year. And the Commission feels that a bountiful supply of vegetables close at hand where they may be secured at a few moments' notice is of even more importance than the mere money value.

Men who are looked upon as the ablest trained thinkers identified with conservation problems of the country, believe in the wholesomeness of home-grown vegetables. They point out that fresh vegetables from the home garden are not subjected to ex-



A FRONT YARD GARDEN

posed to the street, the school house spreading the garden propaganda. Factories of the scattered suburban type in the vicinity. The cottage, standing well back in a broad lot, looks upon its neighborly front yard not a lawn but over an exceptionally abundant garden. In the usual for gardening this boy induced his father to tear out the wide front walk and substitute a narrow plank to give greater room to the garden. The picket fence (or a wire one) is much better for gardening and the look of the city than a tight board fence which hides the untidy yard condition.

posure on the markets or in transportation and are not liable to become infected in any way. Many of the garden products lose their characteristic flavor when not used within a few hours after gathering. By means of the home garden, the production of the vegetable supply for the family is directly under control, and in many cases is the only way whereby clean, fresh produce may be secured.

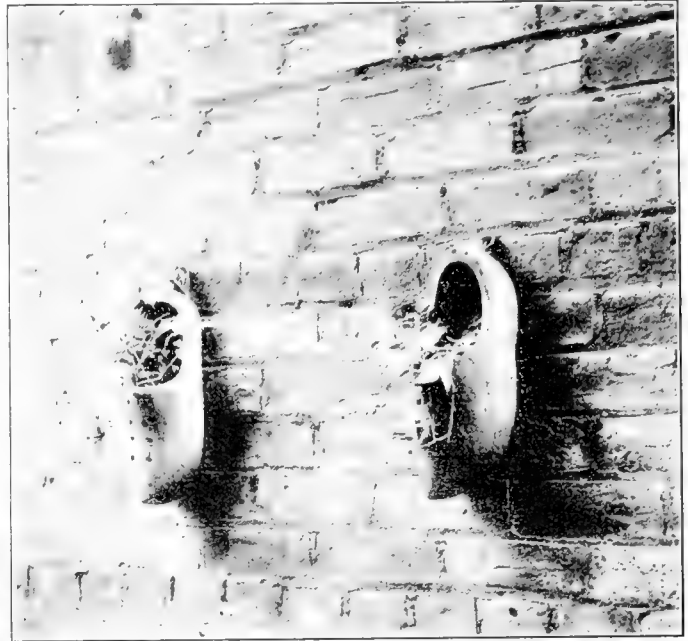
In the cities, towns, manufacturing villages, and suburban communities of the United States there are approximately 13,000,000 children between

the ages of 6 and 20 and if this small army takes up the hoe and the rake and plants food gardens the food problem becomes no problem at all.

It is not difficult to estimate the benefits to mankind once the plans of the Commission are in full operation throughout the country. For the children it will mean health, strength, joy in work, habits of industry, and understanding of the value of money as measured in terms of labor and such knowledge of the phenomena and forces of nature as must be had for an understanding of most of their school lessons. They will also learn something at least of the fundamental principle of morality, that every man and woman must make his or her own living; must, by some kind of labor of head, hand or heart, contribute to the common wealth as much as he or she takes from it; must pay in some kind of coin for what he or she gets.

President Pack also believes that the economic and sociological results are worthy of consideration. Experiments already made show that with proper direction an

the nation is mainly dependent upon the productive powers of its people. Business and professional men appreciate the value of recreation, but oftentimes neglect it for lack of interest. If such men understood the principles of



GARDEN SABOTAGE

No back yard for gardening, this tenement child has her pathetic little garden anyhow—in an old pair of wooden shoes, or sabots. For the benefit of those who have the gardening desire but not the land the food garden movement is being aided in many cities by owners of vacant property permitting its cooperative cultivation by volunteers.

gardening, they would find sufficient incentive to exercise and would take much pleasure from work in the home garden during the evening hours.

With precise knowledge at its command, the National Emergency Food Garden Commission gives the following advice on the location of a garden:



FOOD INSTEAD OF FLOWERS

When you have no land, but live in a tenement with a concrete yard, the best you can do in gardening is in the window box. And if you are homesick for the taste of vegetables crisp from your own garden, you plant the window box to corn, beans, and radishes, such as are growing in this window garden, instead of flowers. The National Emergency Food Garden Commission urges owners of vacant lots to donate them for free garden use to those who wish such an opportunity.



BACK YARD BLUE RIBBONERS

The rural county fair no longer has the monopoly of lettuce heads 21 inches in diameter, nine-pound cabbages, and one-pound beets such as the young planter on the right is holding. These products, which would take blue ribbons against the best entries of the professional gardeners, were raised on city back yard gardens.

average child of reasonable years can produce on an eighth of an acre of land from \$50 to \$100 worth of vegetables. A third of the children in the city schools of the United States might easily produce the \$250,000,000 worth of foodstuffs which is predicted by the Food Garden Commission can be added to the annual crop supply if 1,000,000 more gardens are planted this year than were in existence last season.

Aside from the fundamental and essential reason why the nation should take up whole-heartedly the Commission's injunction to produce, and produce at once, the fact that a generation of men and women would be produced who would find their recreation, after the close of their labor day of eight hours, in profitable home gardening, is a phase of the situation which should commend itself to everyone. A man's worth is measured largely by his ability to produce, and the wealth and prosperity of



WASTE MADE USE

Before these boys and their garden instructor carried their tools and vegetable seeds upon this vacant lot it produced nothing but weeds, which scattered their seeds over adjacent lawns. Now it is giving a large measure of economic independence to several families, in addition to improving the quality of their food. "The waste of vacant lands in and about American cities, particularly in the East, is appalling," wrote Albert Shaw, editor of the *Review of Reviews*, to the National Emergency Food Garden Commission.

"The question of proximity to the house should be given first consideration. As the work of caring for the garden is usually done in spare time, the location selected should be as near the house as possible. The slope and type of soil should be the next consideration. A slope to the south or southeast is usually preferable, because here the soil warms up early in the spring, which permits early planting and stimulates the early growth of crops. Practically any type of soil can be used for the garden, but a sandy loam is to be preferred.

"Good drainage is of prime importance. The land should have sufficient slope to drain off surplus water during heavy rains, but the slope should not be so great as to wash the soil. If the land near the house is level, artificial drainage should be employed. Open ditches or tile drains will be satisfactory. On level land that is not artificially drained it is necessary to plant on ridges or in beds to prevent drowning the crops during wet weather. The ridges or beds should be as wide and flat as conditions will allow, for narrow, sharp ridges dry out quickly.

"In planning the location of crops, consideration should be given to the matter of succession, in order that the land may be occupied as large a part of the time as possible. It is not advisable to have a second planting of the same crop or a closely related crop follow the first. For instance cabbage should not follow cauliflower, Brussels sprouts, mustard, or kale, for many of the same diseases and insects affect all of these crops. Tomatoes, egg-plants, and peppers should not follow each other. In some sections of the country two crops can be grown on the same land each year, while in other sections three or four crops can be grown to advantage."

The Commission is spreading its campaign throughout the country, and the press of the nation, furnished daily with bulletins and other information for the guidance of the amateur gardeners, is aiding the Commission in a laudable manner. It is realized only too well by the men behind the movement that it is not so much a question of production but a question of transporting the foodstuffs. This difficulty confronts the country even today, and with a declaration of war the government heads say most positively that the trains could not be utilized for transporting food supplies across the continent.

President Pack believes that it is the patriotic duty of every man in the United States who owns or controls land to plant and cultivate it. He has studied the conditions in Europe closely and with that dreadful picture of hunger and starvation before him he feels with every government official that no time should be lost in arousing the nation from a lethargic condition to one of bustling vigor, and his plea is to plant food gardens at once. He explains that no campaign of his knowledge has met with such instant success as the food garden plan of the Commission.

"But the work has just begun," he adds. "There must be a million recruits to the army of home garden makers. Wherever there are no clubs they should be formed to foster the work. Effort of any kind seems to be more successful where the individual feels that his neighbor is working with him. There must be no letup in the work started throughout the nation. American cities are to be put to the supreme test—their vacant land must be made to produce a large portion of the vegetables that they consume."

FORESTRY AND THE PAPER INDUSTRY

BY HONORABLE D. F. HOUSTON
SECRETARY OF AGRICULTURE

CONDITIONS in the paper industry have constituted one of the most serious of our domestic problems during the last year. Due to the exorbitant prices charged for news print, the profits of the great dailies were either wiped out entirely or else reduced to a minimum, while the small publishers were brought face to face with suspension and even absolute ruin. Periodical publishers have fared no less badly, the profits of book publishers have changed to losses in many cases, and the price of paper of every kind has risen by leaps and bounds.

The Federal Trade Commission has brought some measure of relief to the newspaper publishers. Competition has been freed from restraint, prices have been made to bear a closer relation to the cost of production, and a more equitable system of distribution has been devised so that the "little fellows" will get their fair share of the manufactured product. But, while the inquiry of the Com-

mission developed artificial control, it developed also that there is almost an *equal balance* between supply and demand in the paper industry.

In 1914, we used about 5,000 tons of news print every day. Our present use has reached 6,000 tons a day and the demand appears to be increasing at the rate of 10 per cent a year, materially faster than the increase in population. To supply our presses with news print requires annually about 3,000,000 cords of pulpwood. To meet our requirements for magazine and book paper, stationery and business papers of all forms, wrapping papers, wall papers, cardboard, fiber board and the like, 4,000,000 cords more of pulpwood are consumed annually. Production barely keeps pace with this consumption. For instance, the estimated demand for news print for the first six months of 1917 is 888,000 tons. Against this is placed an estimated supply of 930,000 tons.



THE GLENS FALLS BOOM, GLENS FALLS, NEW YORK

Pulpwood in the Hudson River on its way to the paper mill, indicating in a small measure the vast quantities of pulpwood taken from the forests of northern New York to be made into print paper.

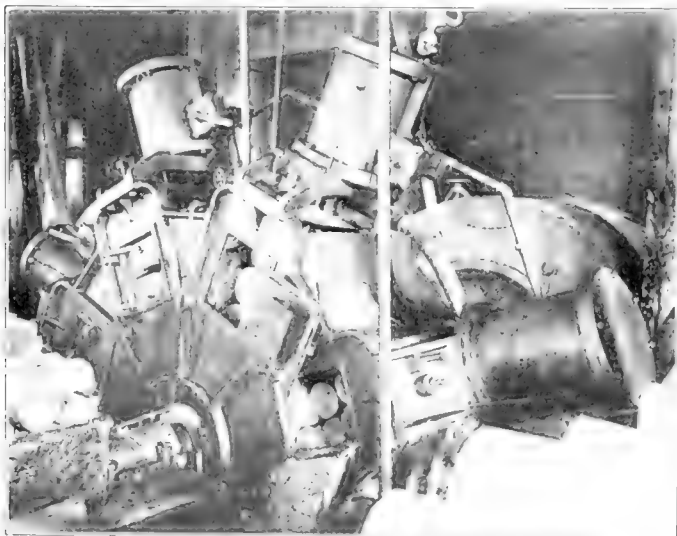
As if this close balance was not peril enough, there is the added fact that the United States depends upon Canada for a third of its news-print paper, either in the form of finished product or raw material. This proportion is increasing rapidly. The pressure of economic conditions and lack of foresight in cutting the forests have so depleted



BEATING OR MIXING MACHINE

The different ingredients which are used in the manufacture of the sheet of paper are put in these tubs, where they are thoroughly mixed and refined by passing the stock between a revolving roll filled with knives, and a stationary plate made up in a similar manner. This process takes place just before putting the stock on the paper machine.

the available private supply of pulpwoods in many of the paper manufacturing states that there is not enough left to last more than ten or fifteen years. As a consequence, Canada is more and more called upon for pulpwoods,



MECHANICAL WOOD PULP GRINDER

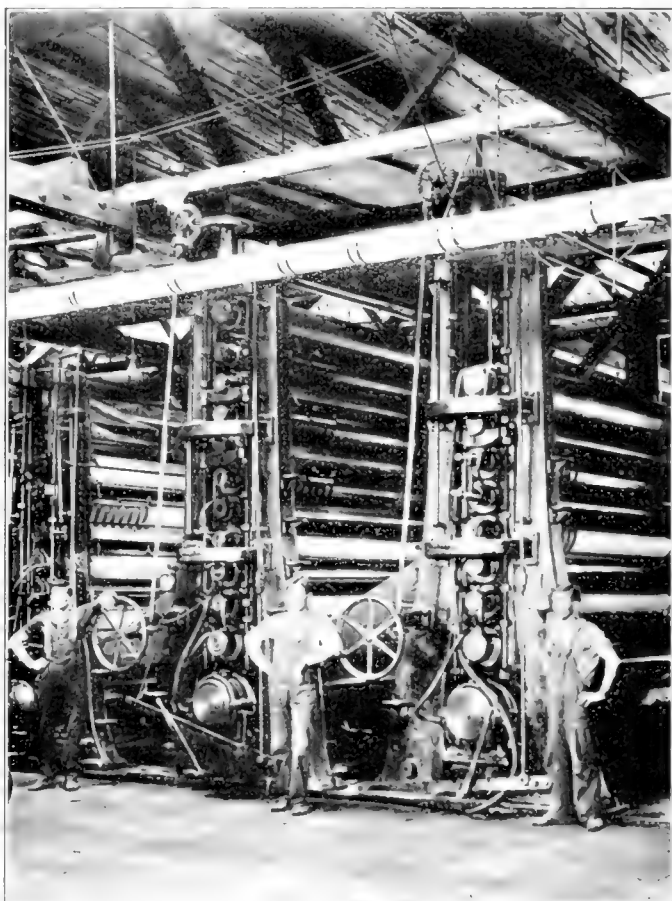
This machine reduces the wood block to pulp, the hydraulic pressure holding the blocks against a revolving sand-stone.

and American manufacturers are showing an increasing disposition to slip across the border into the virgin forests of the Dominion.

It is this condition of dependence that should be ended. Changes in Canadian policy might at any time cut off our newspapers from this source of supply or make it available only at excessive cost. On the other hand, our own forest resources are ample to meet all the paper requirements of the country. Aside from the waste materials produced in the manufacture of lumber and the possible growth on 65 or 70 million acres of cut-over forest lands in the Northern States, the publicly owned National Forests contain enough pulpwood to supply the entire paper needs of the United States for the next eighty years. Cut intelligently, it constitutes virtually an inexhaustible supply for all time.

RAW MATERIALS AVAILABLE IN THE WEST

The Forest Service has estimated the pulpwood in the National Forests at three hundred billion feet. This



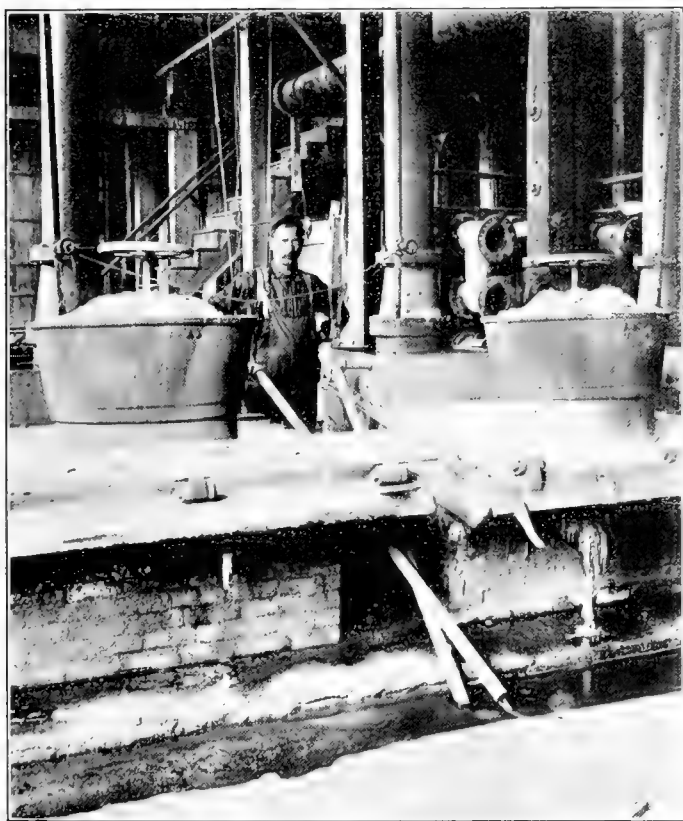
THE PAPER-MAKING MACHINE

This illustration represents the finishing end of a paper machine. The stacks of chilled steel rolls shown in the illustration are used for surfacing, or, in other words, ironing the sheet of paper to a smooth surface. The lower section of the machine represents so-called reels, slitters and winders. Here the paper is trimmed into the desired widths.

means six hundred million cords, and for all paper of all kinds we use but seven million cords a year. There are other large supplies of pulpwood on privately owned lands in the West. These western raw materials are much cheaper than the woods now used by paper mills in the Northeast. While pulpwood stumpage in the Northern States costs from \$2.50 to \$5.00 per cord standing in the forest, first-class western timbers are available at prices ranging from 25 cents to \$1.50 per cord. Long-distance transportation and the large investments tied up in paper

plants necessarily will retard the westward expansion or migration of this industry; but unquestionably it should afford one means of increasing the production of paper to keep pace with current demands.

From the standpoint of geographical location and transportation to the bulk of the paper users in the Central and Eastern States, the western paper woods fall into two broad belts. The first is available to tidewater shipments from the Pacific Coast, lying principally on the west slope of the Cascade Mountains in Oregon and Washington, including vast areas tributary to Puget Sound, and running up along the seaboard in southeasterly Alaska. There are 70 billion feet of spruce and hemlock in the National Forests of Alaska alone. In many respects, its condition as to abundant forests of paper-making woods, water power, and direct tidewater transportation duplicate those of Norway, the leading country of the world in its paper industry. It is a safe prediction that in the



SULPHUR BURNERS

These burners are used in the acid plants of the sulphite or chemical pulp mills or generating the sulphur gases, which are combined with milk of lime for the manufacture of liquor, used in combination with steam pressure, for reducing the wood, which is in chip form, to chemical fiber.

last analysis the value of Alaska to the United States as a source of paper will be found to exceed the value of any other of her enormous resources, coal, minerals, or fisheries.

The second timber belt of western paper woods extends through the northern Rocky Mountains from the Canadian line into Colorado and Utah. This belt, shut off from water transportation, can hardly be considered a practical source of supply of paper for the Eastern States; but is a logical storehouse of raw materials for the paper requirements of the Mississippi Valley. The Rocky Mountains contain a number of excellent paper woods and,

with proper development, should supply both the paper required for local consumption and that necessary to replace the diminishing supplies of the Lake States for the needs of the Middle West.

NEWS-PRINT PAPER FROM NEW VARIETIES OF WOOD

Extending the supply of raw materials by determining the paper-making qualities of new woods is an important factor in the problem. Tests conducted by the Forest Products Laboratory of the Department of Agricul-



NORTH CLEAR CREEK FALLS

The natural fall shown in the picture was included in a power project for which application has been made by F. W. Bosco, Rio Grande National Forest, Colorado. This indicates character of water powers on National Forests.

ture have demonstrated the suitability for various grades of paper of no less than twelve new or little used woods, including Englemann spruce, lodge pole pine, white fir, and other cheap and abundant coniferous woods of the Western States. At least ten of these woods were proved good enough for news print, and papers made from some of them actually were used in editions of the *New York Herald* and *St. Louis Republic*.

Almost equal in importance to the timber of the Pacific Coast belt and the Rocky Mountain belt are the publicly owned water powers, a second primary essential of the paper industry. Undeveloped power is there in sufficient quantity and available for exploitation and use under reasonable measures of Government control. This is equally true with respect to coal, almost as important in paper manufacture as pulpwood itself. Both in Alaska and in the Rocky Mountain region the Federal Govern-



ON THE COPPER RIVER, ALASKA

The prevailing type of combination of water, forest and mountain scenery in Alaska. It is country like this that may supply much of the pulpwood used in the future and which, if need be, can also supply the water power for paper mills.

ment owns great coal fields of tremendous richness, abundantly able, so the experts report, to supply every National need for many years. The one problem to be faced is that of the best means of utilization. How may our tremendous natural resources be given the quickest and most effective relation to the National needs?

The first plan is that of public sales of raw material to the manufacturers. This already is being done to some extent. During the last year National Forest timber sales to lumber companies, railroads, and mining companies and one western paper mill amounted to \$1,795,000. This plan calls for contractual relations between the Government and private capital. New mills might be erected in Alaska, the Puget Sound country, or the Rocky Mountain region, under agreements with the Government for a long term supply of raw material, guaranteed under an equitable adjustment of prices from time to time. This already is being done in the case of certain saw mills. Such contracts may readily contain provisions which give the public effective control of possible industrial combinations or monopolies.

PRACTICABLE TO MANUFACTURE NEWS PRINT IN ALASKA

Experts of the Forest Service report that it is entirely practicable to manufacture news print in Alaska and deliver it to New York through the Panama Canal at a cost of not more than \$35 a ton. When it is considered

that recent prices have ranged from \$60 a ton upward, it is evident that an excellent competitive basis exists for the introduction of western papers.

The development of private paper plants in the West might be supplemented by the erection of mills by the Federal Government itself. It is estimated that a mill with a capacity of one hundred tons of news print a day can be built in Alaska for two and a half million dollars. Even if the output of the mill was confined to the needs of the Government alone, it is probable that such a mill would pay for itself in no great length of time, while adding something to the paper supply of the nation.

SHOULD THE FEDERAL GOVERNMENT ENTER THE INDUSTRY?

The fundamental problem is to build up paper production in the United States to keep pace with a growing demand and afford a sufficient supply at all times to hold prices at reasonable levels. To the extent that private enterprise will do this, it would appear unnecessary for the Government to undertake it, particularly if the publicly owned forests can be utilized for the purpose under conditions which give the public control of industrial organizations. In the event that private capital cannot be enlisted, however, to meet the needs of a larger paper supply available at fair prices, it may be well that the Federal Government should enter the industry as a direct method of controlling the situation.

These are the larger aspects of the situation. There are certain direct and simple approaches, however, that call for nothing more than greater economy. The waste which now occurs in the manufacture of lumber is estimated by the Forest Service at something over 60,000,000

often sell their hemlock slabs to paper mills for from two to three dollars per cord. This is a form of conservation that should be given speed and drive.

So much for the immediate problem of supplying the paper requirements of the United States to-day. For the second phase of the problem, that of an assured future supply of paper within our own borders, there is only one solution: *the practice of forestry to keep up a continuous production of pulpwood.* There is nothing difficult about this solution if the latent producing capacity of the forest lands in the United States is utilized. There is no reason why the regions now supporting large paper-making plants should not do so permanently, as Norway does, if the native resources of those regions are but properly organized and intelligently used. The production of pulpwoods, in fact, offers one of the best opportunities for forestry in the United States because small, quickly-grown material can be utilized for this purpose, and because many of the fastest growing trees, like poplar or Norway spruce, are adapted to it.

With intelligent cutting and protection from fire, the land will restock itself. Unintelligent cutting that "skins" the



NATIONAL FOREST POWER PLANT

Colorado River Company's power plant on Grand River, showing power house building, and spillway flume. This is located on the Holy Cross National Forest, Colorado.

cords annually. At least 40,000,000 cords consist of coniferous woods, a part of which is suitable for the manufacture of various grades of paper, although the cost of assembling it in sufficient quantities to support a paper plant is often prohibitive. Experiments at the Forest Products Laboratory show that much of this waste can be utilized for the manufacture of kraft wrapping papers, fiber board, and other pulp products. In the case of saw mills that cut up spruce, hemlock, etc., the waste can often be gathered and shipped with profit to news-print mills.

The use for pulp of waste material left after lumbering has recently been introduced in lumbering operations in Pennsylvania and parts of the South. Hemlock tops and broken, defective logs are peeled in some Pennsylvania lumber camps, cut into five-foot lengths, and sold for pulpwood. From 250,000 to 260,000 cords of slab wood and other mill waste are now consumed every year for pulp. In 1908, hemlock formed 41 per cent of the saw mill waste used, and its average value was \$4.07 per cord, about two-thirds that of hemlock cordwood in the round. In Wisconsin, saw mills



SHIPPING ALASKAN LUMBER

The weight of the lumber broke down the Hadley Dock in Alaska. The steamer Melville Dollar is lying in front of the dock. This was the first full cargo of lumber to leave Alaska. It comprised 1,200,000 board feet.

land, however, may call eventually for artificial reforestation. Denuded land can be planted with 1,000 young trees per acre, nursery grown, at a cost of about \$10 per acre. Some of the paper companies in New England are acquiring and protecting large areas of forest land, many



POWER AND PULPWOOD COMBINED

Waterfall at head of E-gal-ik Bay, Prince William Sound, Alaska, a possible source of power for a paper mill and dense forest of pulpwoods on the mountain side.

of them culled or cut over, in order to insure a future supply of raw material to protect the enormous investments represented by their paper plants. In a few instances, a limited amount of planting has been done. Considerable areas of inferior pasture land, worn-out farms, and the like in New England have been restocked with trees, either through a gradual reversion to forest by natural causes or by artificial planting, because their owners have realized that these lands of low value could be utilized to the best advantage for producing wood.

In other sections, like considerable portions of the Lake States, reforestation is not coming about through economic development, or is coming about so slowly that it will be far behind the need of forest-using industries for raw material. In such regions public initiative and enterprise must take the lead. Probably the greatest need is for an intelligent, far-sighted administration of the forest lands now in public ownership, in one form or another, and for the addition of cut-over forest lands of low value to the

public holdings, state and Federal alike.

Practically all European countries have found that a considerable body of publicly owned forests was essential in working out their problem of keeping up continuous forest production. The United States will prove no exception to this rule; and the building up of state and Federal forest holdings, under expert, non-partisan administration, is one of the most important steps to insure a future supply of paper as well as other basic forest products.

On the 165 million acres of Federal forest holdings in the National Forests, the timber is being used under scientific methods of cutting as there is demand for it and the lands denuded by old fires are being reforested by planting to the extent of 20,000 acres annually. Federal holdings also are being extended by purchase in the Eastern States, under the Weeks Law, for the protection of navigable streams.

STATE FOREST RESERVES

A number of states have made valuable beginnings in this direction. Pennsylvania has acquired state forest reserves aggregating more than a million acres and consisting largely of culled or cut-over lands which the State has been



AN ADIRONDACK FOREST

Heart Pond and Mount McIntyre from Mount Jo. Typical Forest clearly shown; mixed hardwoods on lower levels with balsam fir and red spruce on margin of pond. Spruce and balsam dominate on higher elevations.

able to purchase at low valuations. New York has extensive state holdings; Wisconsin and Michigan both have small areas; Minnesota recently has passed a constitutional amendment which will permit the creation of permanent state reserves. All these efforts, in the aggregate, fall far short of the need. Particularly in the Lake States, in whose early economic development forest resources probably had the largest part, there is a general lack of an intelligent public conception of this problem and of adequate measures toward its solution.

The right kind of land ownership is fundamental in working out the problem of a sustained supply of lumber, paper and other essential forest products. There must be a stable interest which insures permanent forest production. This may be supplied by general economic development. Otherwise, it must be supplied by the far-sighted point of view of the community, either through direct public ownership or a sufficient measure of public control to secure the results necessary.

An immediate necessity in the accomplishment of this object is to build up the forest departments of the various states—to get behind fire protection, to push reforestation of state lands, to demand acquisition of permanent forest reserves, and to support expert investigative work in forestry. Expert classification of receded



ALASKAN SPRUCE FOREST

At Fish Bay on the Tongass National Forest, Alaska, is the pure spruce stand shown in this photograph. It could well be used for pulpwood.



TYPE OF ALASKAN FOREST

A log boom at Whitewater Bay, Admiralty, Alaska. It is this kind of forest which can furnish quantities of pulpwood in the future.

tax lands should have an important place in this development. Cut-over lands not suited to agriculture or which have a low or questionable value for tillage should be kept by the states and added to their forest reserves so that an aggressive public policy of reforestation may be pursued. This is one line of attack upon the vital and general problem of how to put all classes of land to their most productive use.

Another thing that must be brought about is full recognition of the public interest in *all* forest lands. It is not enough that the state should look after its own holdings; it must extend its authority to the management of private holdings as far as may be necessary to meet public needs. We must recognize, in other words, that forest lands have, in a measure, the nature of public utilities.

A first step in such regulation is compulsory fire protection, the starting point of forestry. Not only, however, should each landowner be required to do his

share in preventing or suppressing forest fires, but the public itself should cooperate by furnishing the necessary machinery for correlating and directing this work as a whole. The State of Oregon has taken an advanced step in this direction, through a law making the protection of timbered lands obligatory upon their owners and authorizing the State Forester to protect lands whose owners fail to discharge this duty.

The cost of such protection, within limits prescribed by the act, becomes a lien against the property. At the same time the state itself expends a considerable sum for a system of fire wardens upon which the entire protective organization is built up and correlated.

In many cases, the protection of cut-over forest lands from fire is sufficient. In other cases it should be supplemented by the enforcement of simple forestry measures, such as the disposal of slashings and the regulation of cutting to make certain that the land will be left in a condition which will insure its regrowth.

TAXATION OF FOREST LANDS

With public regulation, however, should go a vigorous encouragement of private owners to keep their forest lands continuously at work and thus do away with the economic loss represented by the idleness of millions of acres of "skinned" land. Such encouragement is justified by the community benefits afforded by the reforestation of private lands and the burdens imposed upon their owner

in deferring income from them. The community may share in these burdens, as it shares in the advantages of reforestation, by applying the yield, or harvest, tax to forest lands which are properly managed so as to meet their public obligations. The owner thus will be released from the burden of annual property taxes, paying instead a tax on the returns from his property at the intervals when its wood crops are harvested. This concession, of course, should apply only to owners whose lands are kept in continuous forest production.

A number of the states have taken progressive steps in accord with some of these suggestions. Their local forest departments furnish the ground work for building up and expanding the forest activities of the state. The Department of Agriculture also stands ready to give aid and encouragement. Experts of the Forest Service are available to advise with state legislatures regarding forest legislation and to coöperate with state commissions or local associations of citizens in developing the forest policy of the state.

NEBRASKA'S FORESTATION COMMISSION

BY WOODRUFF BALL, SECRETARY

THE State Forestation Commission of Nebraska has drafted for presentation to the Legislature, four bills. One provides for the creation of a permanent Forestry Commission; one for an exchange between the State and Government of the State school lands upon the present National Forest Reserves; two will permit of the counties, cities of all classes and villages of the State establishing and maintaining municipal or communal forests, with power to vote bonds for their purchase and levy taxes for the maintenance thereof, the intent being that these communal forests may also be used for public park purposes and a protection of the potable water sources. The Commission has taken this step in hopes of thereby awakening an interest in similar work on the part of the State Government itself.

The Commission was created in 1913 to investigate the feasibility and desirability of afforesting the State school lands in Western Nebraska, that region of the State which is commonly termed the "Sand Hills." The members are Carl Rhode of Columbus, A. H. Metzger of Roll and Woodruff Ball of Valentine.

After a careful survey of conditions, the Commission shortly following its appointment arrived at the conclusion that at that time the forestation of the school sections or State land was not feasible owing to the fact that these State school lands were in isolated tracts of 640 acres each. Wherefore, the cost of planting and maintenance would be prohibitive. They further found that in view of the work accomplished by the Government Forestry Service upon its two reserves in Western Nebraska, to wit, the Bessey Division and the Niobrara Division, that under proper conditions such a policy as

was contemplated in the resolution could be carried to a successful conclusion.

In the forepart of 1914, the Forestry Service had under consideration the elimination of the Niobrara Division in its entirety and parts of the Bessey Division from the Nebraska National Forest areas. The Commission was able to but demonstrate to the Forestry Service that it was inadvisable to do so and was able to secure an additional appropriation for the Forestry Service which has enabled it to establish upon the Niobrara Division a second nursery to be used in connection with their operations upon this Division. The Commission further secured a soil survey of the two Divisions which conclusively demonstrated that the lands embraced within these Divisions could not be classified as agricultural land and hence was not available for homesteading purposes. This, in view of the additional fact that the Forestry Service is meeting with great success in its plantations, has doubtless put an end for all time to the question of further eliminations.

The Commission, recognizing the fact that the late Dr. Charles E. Bessey of the Nebraska State University was primarily responsible for the establishment of the Nebraska National Forests, felt that it would be a most fitting memorial and monument to Dr. Bessey's memory to name for him one of the Divisions. Acting upon their suggestion, the Forestry Service last fall officially designated the former Loup Division and Halsey Nursery as the Bessey Division and Bessey Nursery of the Nebraska National Forests. The Commission has now made a further suggestion to the Forestry Service that it designate the Niobrara Division and Niobrara Nursery as the Morton Division and Morton Nursery in honor of the late Honorable J. Sterling Morton.

THE INDEPENDENCE OF AMERICAN NURSERIES

BY DAVID FAIRCHILD

AGRICULTURAL EXPLORER IN CHARGE OF FOREIGN SEED AND PLANT INTRODUCTION

THE nurseries of this country are quite as independent of foreign plant material as are the other industries which American ingenuity and industry have built up, but, like all the other great industries, that of the production of small plants has not confined its activities to the growing of American plants or the handling of home-grown material.

I have ridden through nurseries in the West where the rows of nursery stock were a mile long and where there were thousands of these rows of small plants waiting to be sent out all over this country and into Canada.

The customs returns for the year 1915 give an import of plants in a living condition, as distinct from food materials of a plant nature, amounting to \$3,731,000. Of this amount about one million represents what might be called hard wooded plants such as evergreen and deciduous trees and shrubs which are set out with the idea of their becoming permanent residents of our parks, our orchards or our roadsides. The remainder represents the large importations of so-called florists' stock—such things as lily of the valley clumps for florists, hyacinths, tulip bulbs, bleeding hearts, lily bulbs, narcis-



GOVERNMENT BULB CULTURE

Portion of nursery planting of narcissi at the United States Department of Agriculture Bulb Garden, Bellingham, Washington. Madame Plomp in the foreground, Sir Watkin in the background. This picture demonstrates the possibility of bulb culture becoming an American industry.

This one firm alone plants a million and a half peach pits and half a million apple seedlings each year, and lists from 1800 to 2000 different varieties of plants for sale in its catalogue. Sixteen horses harnessed in teams together were pulling the machine which undercuts the small apple trees preparatory to lifting them for packing and shipping. Twenty-five miles of tile drains had been laid under the ground to carry off the superfluous moisture.

The nurseries of this country cannot be said to be dependent upon foreign sources in the way in which this term is commonly understood, but that there are thousands of species of plants needed by our nurserymen for the development of the greatest possible number of superlative varieties of native plants cannot be doubted.

sus bulbs, begonias, gloxinias, orchids, palms, azalea plants for forcing, iris, cannas, dahlias and amaryllis—plants which as a rule are either grown under glass or for a season or two in our flower borders or on our lawns and which, with perhaps one or two exceptions, can be grown in this country.

If we consider the imports of hard-wood material, for example, we find that we import 8,776,000 young seedlings of the apple, pear, quince, and St. Julien plum valued at \$41,314. If we assume that a half of these grow and are budded or grafted and set out in the orchards of the country, they will represent in the course of time 4,388,000 fruit trees, and assuming that the average distance apart of these trees in the orchard would be 20 feet,

these would represent an orchard or orchard areas totaling over 40,000 acres in extent. An orchard a mile square is a large orchard even to-day, and this 40,000 acres would represent 62 such square-mile orchards which would have root systems developed in American soil from the tiny rootlets which were produced first in the soil of some foreign country, be it France or England or Japan.

The question then is open for discussion as to what advantages and as to whether there are any disadvantages in having such a proportion of our orchards which

We know that there are root diseases, and serious ones, and there is no question that they may be carried by seedlings, but whether these are of such a nature as to make it advisable to shut them out of the commerce of the country is a question for the experts to decide and not one to be settled by political action.

The nursery firms of the country can grow apple and pear and quince and plum seedlings, and many are now growing such stock, but they could not grow the quantities required to supply the demand in the first year after



CHINESE WILD PEACH PLANTING

Portion of a nursery planting of the Chinese wild peach, *Amygdalus davidiana*, at the United States Plant Introduction Field Station, Chico, California. This peach has proven very valuable as a stock for dry lands and regions too cold for the cultivated peach.

we set out every year upon a root system taken bodily from a foreign soil and perhaps carrying the diseases of that country with them. Certainly it must be admitted that this whole question of the proper stock for our orchard trees is one the importance of which can hardly be overestimated. The fact that the plants which were imported cost us only \$41,000 or a dollar an acre and is a small import item should not mislead us, for the potential value of these trees will run easily into the millions.

On the other hand, it would be eminently unfair to assume that because we do not know that these little apple seedlings from the old world or from Japan are as clean and free from disease as any which we can produce in America, they represent undesirable immigrants and should be excluded from the country. Or that the diseases which they have are ones which will prove as serious or even more so in this country than they have in their native land, or that they will infect our soils and through this infect our orchards with diseases which they would get in no other way.

It is probably true that the principal reason why these seedlings are imported is because they are cheap—cheaper than it would be possible to produce them in this country. The question is one for a thorough and exhaustive investigation and the facts discovered will point the way to an intelligent handling of the question of their importation.

the foreign supply is cut off, supposing it should be, because they would have difficulty in getting the seeds and in establishing them in seed beds, and it would take two years or more for them to adjust themselves to the changed conditions.

When we turn to the imports of fruit and ornamental trees, evergreen shrubs, vines and all trees and vines known as nursery stock of which we imported \$805,305 worth in 1915, the conditions are different. Millions of this class of plants are already being grown in this country by our more progressive nursery firms.

There can be no question that the nurserymen of this country, at least the best of them—and there are no keener plant students in agriculture than are these American nurserymen—question the advisability of the large importations of so-called ornamental evergreens and other dooryard shrubs which are made from Europe largely through the department stores where they are used for advertising purposes. The department stores make no pretence to a knowledge of the quality of this class of material. It is cheap and they can almost afford to give it away. But often the purchaser has never before bought a plant for his dooryard. He looks upon a plant as a plant and puts it in carefully—as carefully as he knows how to—and it dies and he is discouraged and when the legitimate nurseryman tries to sell him a real plant that

will grow and thrive in his dooryard his mind goes back to his unhappy experience and he shakes his head and turns away with the thought in his mind that he has an unlucky hand with plants. The department store has advertised its own name, but the nurseryman has lost a customer, and the dooryard of at least one house is still ugly with dirty bricks and an ugly ground line.

Now I am not in possession of the facts to accuse the department stores of doing this wittingly, neither do I have any figures to show that the percentage of failures from this imported material is greater than from home grown nursery stock. I do know of instances where totally unsuitable plants have been imported and sold cheaply through department stores and others and died, and the stores have shifted the responsibility upon the foreign importer. The question concerned here is not one of the dependence of our nurseries at all. They do not, as I understand it, court or countenance this trade in cheap plants from abroad.

But how large a part of this item of \$805,305 represents plant material of this kind, I am unable to state. The fact ought to be determined and the advisability of its exclusion considered, provided that it represents a danger to our forest or street or park or ornamental plants.

That the American nurserymen need foreign plants in their business is a fact which ought to be given due consideration. Thousands of plant breeders and horticulturists are working in the gardens and orchards and nurseries of other parts of the world and an increasing number of new and valuable plants are being brought into existence, so to speak, and many of these are of dis-

tinct value to the people of this country, and the nurserymen of America represent the machinery through which these new plants can reach the commercial orchards and gardens of the country.

The inroads of diseases which we already have among our trees and other plants may make it imperative at any time to import some other species or variety to take its place. The spread of the chestnut bark disease and the search in China for a resistant form has led to the importation of millions of seeds of the downy chestnut of Eastern China, a resistant form unfortunately of small size but producing excellent chestnuts. The devastation produced by the pear blight which has swept the orchards of the Pacific Coast and causes millions of dollars' loss each year has centered attention recently upon a sturdy wild pear immigrant from the hills around Jehol north of Peking, which Reimer of Oregon has discovered is practically immune to this disease and at this present moment Mr. Meyer, our explorer, is buying up as many seeds as he can get of this disease-resistant species in order to test it in commercial orchards throughout this country.

Of course, it is conceivable that the Phylloxera might have been kept out of Europe indefinitely, but when it did get in, what are we to say about the rôle which the French and American nurserymen played in the rehabilitation of their vine-growing areas? And what would the vine growers have said to a policy which had restricted all the imports of the Phylloxera-resistant American stocks to the few hundreds or thousands which might be brought in through the slow and deliberate process of Government importation? It is true that in importing



MILLIONS OF YOUNG TREES GROWING IN A NURSERY

This view in one of the D. Hill Nurseries, Dundee, Illinois, gives one but a faint impression of the extensive nurseries of this firm, which are now growing millions of young, home-grown trees for planting out in this country. White Cedar, *Thuja occidentalis*, to the left; Norway Spruce, *Picea excelsa*, to the right.

the American vines, France imported the black rot of the grape and had to learn how to combat it, but the vineyards of France, so far as I know, are as flourishing as they were a generation ago. The wave of prohibition sentiment and legislation has made more difference to the vineyardists of this country already and makes more in France than all the grape diseases which have yet been discovered.

The shifting character of our plant industries is a matter which should not be lost sight of, I believe, in the consideration of any policy of national independence of our nurseries. This is true of both our annual and perennial crops, the areas of which are changing constantly. Look at the shift made by the flax area. Flax growing for oil has been pushed clear up into the extreme Northwest, even over into Canada. Consider the abandoned rice fields of the Carolinas and the immense new rice areas in California and Texas. Think of the great pear orchards of Georgia of twenty years ago which have been abandoned and are rapidly going to decay, or the great pear orchard areas in California which are now planted to barley. Consider the ghastly spectacle which Europe now presents where thousands of square miles of forest have been destroyed and strips of land miles in width and hundreds of miles in length have been so torn up by the shell fire that it is unfit for crop cultivation. Think of the readjustments that are going to take place in the agriculture of Europe where whole populations have been either wiped out of existence or find themselves reduced to abject poverty. I walked out under the forest trees on my place in Maryland and considered the changes which have taken place in the policies of the world since they were little seedlings.

The owner of my property was in those days ready to lay down his life in defence of the principle of slavery. The destruction of the forests was the advocated policy of the time. The discovery of paper pulp had not been made. The match and kerosene and gasoline and all the great chemical discoveries were still unmade when those trees were little seedlings. And when I look ahead and try to imagine what will be the situation in this country with regard to the plants which constitute our forests and our agriculture by the time the seedlings under my feet are grown up, I cannot feel the same degree of confidence which some people seem to have, that we can

decide now a policy which will protect these little seedlings for the next hundred years, in the face of the gigantic changes in transportation and commerce which those years will produce.

We can say to ourselves, "let us be independent of foreign plant production. Let us protect our own by

building a wall of quarantine regulations and keep out all the diseases which our agricultural crops are heir to and have this great advantage over the rest of the world." But the whole trend of the world is toward greater intercourse, more frequent exchange of commodities, less isolation, and a greater mixture of the plants and plant products over the face of the globe.

It seems to me that it will require the keenest research talent, the vastest amount of knowledge, the greatest ingenuity, unthought of amounts of money, and the wisest possible legislation to prevent the spread of the diseases of our economic plants and I cannot help feeling that each disease will require individual consideration and special legislation perhaps, and that in the end

there will be some sad failures and that mankind will not be able to preserve from destruction all the species of plants which he loves, even though he does devote to the task more intelligent labor than he has given to the preservation of the great food animals of the world which are so rapidly disappearing from its surface.

How far the restriction of plant immigration will lead to the building up of our horticulture and forestry it is difficult to say. The restriction of the breeder and the nurseryman in the species which he would have at his disposal would tend to limit his activity and his interest and slow down the process of the production of new forms. I believe there is no stimulus to the breeding and selection of plants which is greater than that produced by the placing in one's hands of other and different forms from those which one is accustomed to have about, and it seems to be an undoubted fact that the creation of new hybrid forms depends largely upon the possession of many species of a genus which can be crossed and recrossed until the desirable characters of all are gathered into one or more superlative hybrids which possess the great commercial value which is sought after. Any policy which slows down the active work of the country in this most important regard should be scrutinized with the greatest care and, if necessary, modified so as to allow of its development.



DISEASE-RESISTANT CHESTNUTS

A block of the Chinese Chestnut, *Castanea mollissima*, which inoculation experiments have shown to be quite resistant to the chestnut bark disease. The seed from which these young plants were grown was collected in China by Frank N. Meyer, Agricultural Explorer, and the plants were sent to experimenters in the area where the native chestnut was killed by the chestnut bark disease. It forms too small a tree to take the place of our American chestnut, but it produces excellent sweet nuts.

THE DOGWOOD

BY DR. R. W. SHUFELDT, C. M. Z. S.

CORRESPONDING MEMBER, THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

IF there be one growth which more than any other impresses us with the charms of the early days of May in the country, the Flowering Dogwood is most assuredly the one. More than this: the same magnificent tree or shrub is equally decorative for a long time in the autumn. At the latter season, however, it is the leaves and not the flowers that are the parts so brilliantly in evidence. They are simply gorgeous in their coloring, and their blaze of scarlets, crimsons, reds, and golden yellows may be perceived through the woodlands and forests fully as far as one can see. The bunches of waxy berries, a rich vermilion in color, take part in all this, adding their share to the general rich color scheme.

This Flowering Dogwood is the species that generally comes up in one's mind in speaking of dogwood; but as a matter of fact, it is but a single representative of quite a numerous group or family, which botanists have designated as the Dogwood family, or *Cornaceæ*. Some of these may be herbaceous growths, but only rarely is such the case; as a rule, they are either trees or shrubs. In structure they are all interesting. In one genus of them the flowers are found to be perfect, and the leaves generally alternate. In a second group of dogwoods the flowers are unisexual—the two kinds being found on separate, individual shrubs. In this genus, too, the leaves are alternate, and the flow-

ers greenish. It has received the name of *Nyssa*, and to it have been relegated the Tupelos, the Pepperidges, and the Sour Gums. These are all trees, and the word *Nyssa* is derived from "Nymph," as the original species is a tree that grows in the water. All the species are trees, indeed *Nyssa aquatica* is a large tree. There is also the Black Gum (*N. sylvatica*), and its variety *biflora*, which is also a tree flourishing in the marshes of some of the Southern States. These three are all the species in the genus *Nyssa*; and the already mentioned Black Gum, with its dense, close-grained wood, finds some use in particular trades where such a wood is in demand.

Strange to say, the Dogwood family is related upon the one hand to the Parsley family, and upon the other to the Heath family (*Ericaceæ*); this brings us to a consideration of its typical genus or group, the genus *Cornus*, containing the Cornels or true Dogwoods. The wood of all these dogwoods is verily as hard as horn; and, as the Latin name for a horn is *cornu*, we have the generic name *Cornus*. Apart from the characters of the more minute structures, there are three very prominent ones: the bitterness of the bark, which possesses certain tonic properties; the tough, hard wood, and the entire, opposite leaves (except in one species).

Next to the Flowering Dogwood, in the matter of being a favorite plant, is, perhaps,



AN EXCEPTIONALLY HANDSOME DOGWOOD TREE

FIG. 1.—This magnificent specimen of Dogwood in full blossom presents the correct form of its growth when not impinged upon by surrounding trees. It will be observed that, when in full flower, its leaves are but little more than started.

the Dwarf Cornel or Bunchberry, which not only has a range from Maine southward to New Jersey, and westward to California, but is known to occur in the White Mountains and Adirondacks at elevations ranging up to 4000 feet. Its center of abundance is in the rich, damp woods of New Jersey, where it is well known; and, as its beautiful, red berries are very conspicuous in the fall, it is likely that people there gather and eat them, as it is a well-known fact that they are quite edible. Smallest of all the cornels, it blooms in June, in the center of its range; its tiny and greenish flowers are centered in a bunch as in the Flowering Dogwood, and they are, as in the latter, surrounded by a pointed, four-to six-leaved involucre resembling true petals. Gray says that the leaves and involucre may be, indeed often are, variously colored; and Mathews remarks that "the leaves are light yellow-green, broadly ovate, pointed, toothless, and deeply marked by about 5—7 nearly parallel, curving ribs; they are set in circles." After one knows this attractive plant, it will never be forgotten, so striking are its characters. Neltje Blanchan says that the tight clusters of round berries are lifted upward on a gradually lengthened peduncle after they fade, and in some of the popular botanies they are figured in that way; in fact, one author has even figured the flowers and involucre upon such an elevated stem, describing it so in the text. This is an interesting point to settle with respect to the

bunchberry. Gray says not a word about the flowers and their involucre being borne on a stem *above* the whorl of leaves.

Around Quebec and in Newfoundland, and as far northward as Alaska and Greenland, there is another species of dogwood (*C. suecica*), which is very much like the bunchberry but slenderer; it flourishes upon the headlands and cliffs, and it is probable that but few botanists have seen it growing in nature.

Reference has already been made to the Common Cornel or Dogwood. It

is the *Cornus florida* of the books, and it is found in dry woods from southern Maine and Minnesota northward to Ontario and southward to Texas and Florida. It may occasionally become quite a substantial tree, as will be appreciated by a study of Fig. 1 illustrating this article. If the involucre is regarded here as the four petals of a flower, more than two thousand flowers can be counted on this tree; but, as a matter of fact, each involucre surrounds many flowers (see Fig. 3), therefore there are in reality many thousands of flowers upon such a growth. Some dogwood trees are fully forty feet in height.

Not a few of the winter birds in the North Atlantic and New England States feed upon the brilliantly red berries of this dogwood; and the hard seeds being indigestible, they are certain to be dropped far and wide in other forests and woods, the species thus being distributed in new

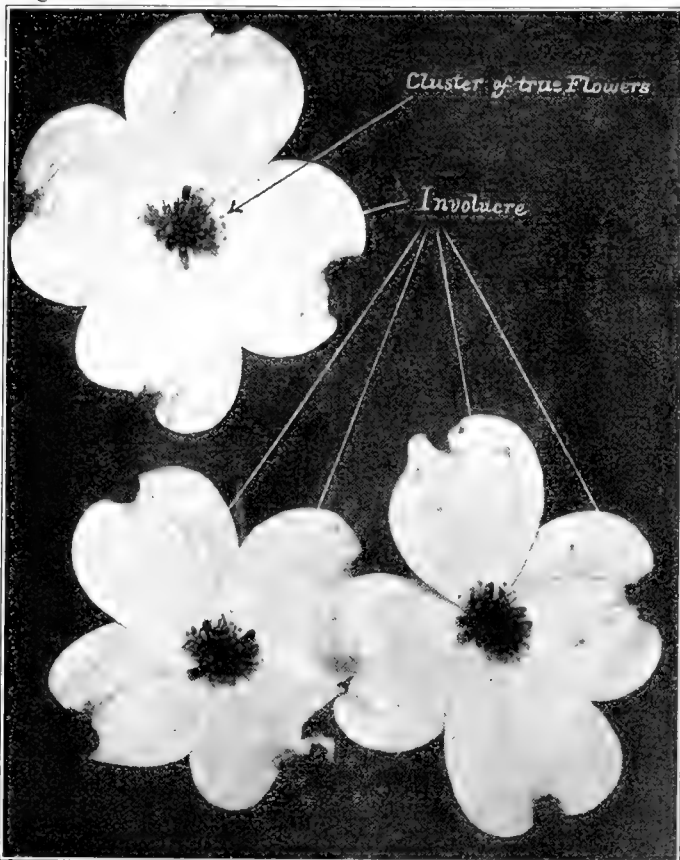


BEAUTIFUL DOGWOOD FLOWERS IN EARLY SPRING

FIG. 2.—This picture presents an example of Dogwood (*Cornus florida*) in full blossom; it was collected at Thrifton, Virginia. They are here represented about one-sixth natural proportions; the leaves are few, but of some size, as it was obtained during the middle of May (1915).

localities, often at long distances from where the parent tree grew. Many times flocks of hungry cedar birds have been seen in the winter hurriedly flying into one of these dogwood trees, laden with its scarlet berries, there to bolt these down. As is known the berries, while attractive to the eye, contain but little nutriment beneath their skins.

Thousands of ruthless hands break off the branches of the Flowering Dogwood during the months of May and



FLOWERING DOGWOOD BLOSSOMS SHOWING TRUE FLOWERS BUNCHED IN CENTER

FIG. 3.—Three full flowers of the Common Dogwood (*Cornus florida*), the two larger ones being quite perfect. The several true, small flowers are bunched together in the center, in open, naked cymes. The four surrounding, petal-like white leaves form a false corolla, and is known as an involucre. A true corolla formed of petals is seen in such a flower as the common buttercup, where they are yellow. Note the curious notches in the middle of the outer border of these pseudo petals—an ever-present character in these blossoms.

June, and this easily accounts, not only for its steady disappearance at this time, but for the poor, mutilated examples of this splendid shrub so often seen by the roadsides, or at short distances from them in the woods.

Thoreau says that when the farmers in some parts of New England hear the notes of the brown thrasher in April about corn-planting time, they translate them to mean "drop it, drop it—cover it up, cover it up—pull it up, pull it up"; but they will not heed this advice until satisfied of its soundness through observing that the Flowering Dogwood is in full bloom.

Many insects are responsible for the fertilization of the dogwood flowers, especially certain butterflies, bees and flies—a fact any one may observe by simply selecting some dogwood tree in the spring, when it is in full flower, and watching the numerous insects that visit it.

The wood of the flowering dogwood is very smooth, close-grained, and hard, and owing to these qualities, it

has been extensively used for making toothpicks. It has been called prick-wood or skewer-wood, as it has long been used to make butchers' skewers in some parts of the country. An authority at hand says that this wood "is so exceptionally free from silex that watchmakers use small splinters of it for cleaning out the pivot-holes of watches, and opticians for removing dust from small, deep-seated lenses." Medical works state that the bark as well as the root of this species is used in the United States as a substitute for Peruvian bark in cases of fever. There is scarcely any grit in its wood, and it is therefore useful for making bobbins and shuttles for weaving; for still other uses the cabinet maker will use no other wood. Other species of Cornels do not come in here, for the reason that they are mere plants, never even attaining the size of a small shrub.

There are two kinds of dogwood in which the fruit is blue, associated with other distinguishing characters; these are the Round-leaved Cornel or Dogwood, and the Silky Cornel or Kinnikinic, the first being the *Cornus circinata* of science, and the other the *Cornus amomum*. We may find the round-leaved species from Nova Scotia to



BUMBLE BEES DELIGHT IN VISITING DOGWOOD FLOWERS

FIG. 4.—Two flowers of the Common Dogwood (*Cornus florida*), seen upon side view. This picture shows a number of the young leaves about a week after they have started to grow. They are thick, pale green, and lanceolate in outline. This specimen was obtained very early one cold spring morning, and the bumble-bee in the upper flower was so chilled that he never so much as moved during the operation of photographing it.

Virginia and Iowa, westward to North Dakota. It is a shrub that may grow to be some nine or ten feet high, occurring chiefly in open forests and on hillsides where the sun rarely penetrates. It favors rocky localities, and may sometimes be found growing along roadsides. Its twigs are greenish, and curious waxy growths may be discovered upon them. Examine the leaves, and they will be found to be woolly upon their under sides. In shape

they taper to a point, though the general form is roundish, hence the name of the species. Blossoming in May and June, or in July farther north, they are easily recognized by their small, flat flowers, which are white, and may measure as much as two inches in diameter; they are arranged in clusters, and no involucre is present. Petals are gen-



FRUIT AND LEAVES OF FLOWERING DOGWOOD IN THE AUTUMN

FIG. 5.—Extremities of dogwood twigs in the autumn. Note the curled form of the large orange and scarlet leaves. At the end of the twigs the berries or fruit are of a splendid vermilion color, and look as though they were made of red sealing wax. Each is of an ellipsoidal form, and the eight to ten in each cluster are bunched together at their bases. In the upper bunch note the single little round white buds, which represent the early stage of the flowers of the succeeding spring.

erally four in number, and branches are sometimes streaked with white. From the bark of this round-leaved dogwood is extracted "cornine," which has many of the medicinal properties of quinine, and is sometimes prescribed by physicians in the country where a strong tonic is indicated. Its light blue berries are not edible, and this shrub will grow in any kind of soil imaginable, whether it be of the richest, or of a quality so poor that it would not support any other kind of plant life, as Dr. Asa Gray goes so far as to say actually "on rock."

Another dogwood which has light blue fruit in the autumn is the Silky Cornel or Kinnikinic—a shrub that may sometimes grow to be nearly nine feet in height, while the branches, instead of being whitish as in the last species, are purplish. It gets its name of "Silky" from its silky, downy leaves, which are so upon their under sides, and which are of a rusty color. Formerly it bore the scientific name of *C. sericea*, but it is now the *C. anomum*. In form, the leaves are pointed, and are subject to vary somewhat. This has led one botanist to describe the supposed variety as a new species (*C. purpusi*, Koehne). As a rule, the Silky Cornel grows in wet localities from Newfoundland westward to North Dakota, and southward to all the Gulf States as far as Louisiana. Some people call it the Swamp Dogwood; and in the old days some of the American Indians smoked its powdered bark, believing that it acted as a tonic.

Some of the Cornels have white or pale, lead-colored fruit, generally pure white, as is the case with *C. asperifolia* and *C. baileyi*, the form being rather a tall shrub, and may occur from Lake Erie to Minnesota and far southward; it flowers in May and June. In another group is found still other species, as *C. alternifolia*, *C. paniculata*, and also the Stiff Cornel or Dogwood (*C. stricta*)

For the present purpose it will be necessary to describe but one more, and it, too, belongs in the same assemblage as the last three species. It is the Red-Osier Dogwood (*C. stolonifera*). It may easily be recognized by its lead-colored but oftener pure white fruit. Its branches resemble osier shoots; those of the year are of a brilliant reddish purple and quite smooth, and to this Gray adds that its ovate leaves are roundish at their bases, abruptly short-pointed, roughish, with a minute close pubescence on both sides, whitish underneath. It is partial to wet soils or soft, moist soils. By the aid of its running shoots, it is now found from Newfoundland to Mackenzie, south to the District of Columbia, then across the United States to the Pacific Coast region. It bears small, flat-topped flower clusters as late as July, and still later, August, to the northward.

Thus it is seen that the Dogwood family is far more extensive than is generally supposed. Economically, their wood is of considerable use, even in the arts, while their wide distribution, their decorative and attractive appearance, and early blossoming, all invite one to be extremely considerate of their conservation, and to encourage their more extensive cultivation in large gardens, on the border lines of estates and similar properties.

THE United States Forest Products Laboratory [at Madison, is trying by many experiments to find ways to cut the price of paper, and thus give material aid to publishers. The increasing cost of pulpwood has focalized attention upon the possibility of utilizing sawmill waste for the manufacture of chips suitable for pulp. An exhaustive study has been completed showing the extent to which mill waste is now used in making pulp as well as methods of barking, chipping, screening, drying, and baling chips.

THE WARBLERS

(Family Mniotiltidæ)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

PERHAPS no family of birds plays a greater part in the protection of our forests than the warblers.

Being primarily woodland birds, they arrive in the spring when the leaves are just beginning to unfold and the hordes of caterpillars emerging from the eggs in which they have passed the winter. Not a twig goes unnoticed, scarcely a bud unscrutinized, as this army of busy travelers sweeps on to its northern breeding ground. During April, May, and June, when the migration is in progress, they practically rid the trees of insect pests which otherwise would defoliate them in a single season.

But besides this economic appeal they have an æsthetic one, and certain it is that no group of birds is more attractive to the beginner in the study of ornithology than these multi-colored, active, forest-dwellers. At first they baffle him with their great variety of colors and rather nondescript songs, but they lure him ever to more persistent effort by challenging his acuteness, his perseverance, his woodcraft.



A WATER SPRITE

A Louisiana water-thrush with larvæ of the black fly for its young. Rocky streams and dashing cascades make a home for this graceful warbler.

The Mniotiltidæ is one of the larger families of birds, containing about one-hundred and fifty-five species confined entirely to the new world. In summer they are found from northern Alaska to Argentina but only about fifty-five species visit the United States. Forty species are confined to South America, thirty to Central America and Mexico, twenty to the West Indies, and ten to the Galapagos Islands. Thus it will be seen that, although the warblers are undoubtedly of tropical origin, they now reach their highest development in North America. Of

the North American species, it seems that quite a number have come into the United States from the West Indies, while others have originated in Mexico. The former, which include principally the genus *Dendroica*, notably the black-throated blue, the black-throated green, the magnolia, the chestnut-sided, and the bay-breasted warblers, are, as yet, confined mostly to eastern United States.



THE DOMED NEST OF THE OVEN BIRD

The oven birds and water-thrushes belong to the warbler family in spite of their common names. They are terrestrial birds, the oven bird spending its life among the leaves of the forest floor. Its ordinary song resembles the words—"teacher—teacher—teacher—teacher," but it has also a remarkable flight song.

Those of Mexican origin have spread over both the east and the west so that, today, there are about twice as many species in eastern United States as in the west.

Each species is characteristic of some particular faunal area as well as some particular habitat. Thus, after they have settled down for the summer, we find that certain species never nest north of Virginia, others never south of New York or Pennsylvania, and still others always north of the boundary of the United States. Among the warblers that go far north to breed might be mentioned the blackpoll, the Tennessee, the palm, the myrtle, the bay-breasted, the Blackburnian, the orange-crowned, and the Cape May warblers, and a little farther south, the magnolia, the black-throated blue, the black-throated green, the Nashville, the mourning, the Canadian warblers, and the water-thrush. The common breeding warblers of the northern United States are the yellow warbler, the red-start, the oven-bird, the yellow-throat, the black and

white, the chestnut-sided, and the pine warbler, and of southern United States, the Louisiana water-thrush, the Kentucky, the yellow-throated, the prothonotary, the



DOWN WITH THE CANKER WORM

A female mourning warbler feeding its young one of these leaf-destroying caterpillars. The warblers are the tree doctors and keep the trees in good health by defending the foliage against the ravages of caterpillars, aphids, etc.

blue-winged, the cerulean, the hooded, the worm-eating warblers, and the yellow-breasted chat.

Each species is characteristic also of some particular habitat; the oven-bird and water-thrushes are terrestrial, the Kentucky, blue-winged, and chestnut-sided warblers, and chats are birds of the undergrowth, while the black-



THE LARGEST OF THE WARBLERS

The yellow-breasted chat is a bird of bizarre habits whose timidity makes a close acquaintance impossible and photography extremely difficult.

burnian and yellow-throated warblers confine themselves largely to the tree-tops.

Since all the warblers are insectivorous, they are, perforce, highly migratory, seeking southern climates when the insect supply is exhausted in the North. Some of our species go only to southern United States for the winter, and the myrtle warbler, which is rather an exceptional species, and perhaps the hardiest of all, winters often as far north as southern New York, changing its diet to one of bayberries. Sometimes it even takes suet from a feeding station, together with the chickadees and nut-hatches. The pine warbler, which nests throughout the eastern United States, merely withdraws in winter to the southern third of its breeding range, from North Carolina southward. Thus it probably has the shortest migration of any of the species. The palm and orange-crowned warblers and a few black and white, yellow-throated, worm-eating, parula, black-throated blue, prairie warblers, northern



IMPOSED UPON

A nest of a redstart containing an egg of the parasitic cowbird as well as two of its own. The cowbird imposes upon many of the warblers but some of them have learned to build another floor over the unwelcome egg and thus prevent it from hatching.

water-thrushes, and oven-birds remain in Florida for the winter, but the majority of species and individuals continue farther south. The actual distance traveled varies a great deal. The prairie, black-throated blue, Swainson's, Bachman's, Cape May, and Kirtland's spend the winter in the West Indies; the worm-eating, magnolia, chestnut-sided, black-throated green, hooded, blue-winged, Nashville, orange-crowned, parula, palm, and Wilson's warblers, and the chat fly across the Gulf of Mexico to Central America, while the black and white, prothonotary, golden-winged, Tennessee, yellow, cerulean, bay-breasted, blackpoll, blackburnian, Kentucky, Connecticut, mourning, and Canadian warblers, the redstart, oven-bird, and both the water-thrushes continue into South America—some even to Brazil. The shortest journey which any blackpoll makes is thirty-five hundred miles, while those that nest in Alaska probably travel seven thousand miles

yearly to their winter home in Brazil. Nearly all the warblers of western United States spend the winter in Mexico and northern Central America.

It might be expected that those species which migrate to South America would follow the chain of West India Islands, keeping thus always within sight of land, but such is the case with only a few species, the majority preferring the direct flight of five hundred miles across the Gulf of Mexico. They migrate mostly at night, although they continue their northward journey slowly during the day, feeding as they go. Occasionally they make long flights across bodies of water by day, but usually this is done at night. What guides them on these journeys may always be a mystery, but it is now thought, and there is good evidence for so believing, that birds have a special and very highly developed "sense of direction." Ordinarily they migrate from a few hundred feet to nearly two



A COZY HOME IN THE MARSHES

A female yellow-throat on its nest among the sedges. One of these yellow-throats holds the record of having eaten 3500 plant-lice in forty minutes.

miles above the earth but, on cloudy nights, they descend to escape the clouds and then often become confused by the illuminations in light-houses or tall buildings and dash themselves to death against the glass. Several hundred birds, a large percentage of them warblers, have been picked up at the foot of a single light-house, the Washington Monument, and similar places, after a foggy night.

As might be expected, the first warblers to push northward in the spring are those which are the hardiest and whose migration routes are the shortest. Thus the pine and the myrtle warblers arrive in northern United States while the trees are still bare, and the blackpolls do not begin to arrive until the middle of May. In the fall the redstarts and yellow warblers start back before August while insect food is still most abundant, but the myrtles and others of short migration routes remain until the leaves have fallen.

One might assume from the name of the family that these little birds are beautiful singers. The truth is, however, that there are very few whose songs are much more musical than the calls of insects. Others whose songs are weak make up in sweetness what they lack in volume. The water-thrushes with their wild, ringing notes, the chat with its loud, bizarre calls and whistles, the oven



THE WORLD BEFORE THEM

Young cerulean warblers ready to leave the nest. The lichen-covered nest is one of the more unusual types found in the family and is extremely inconspicuous and difficult to find.

bird with its varied flight song, are, perhaps, exceptions. The simple trill of the yellow warbler, the wheezy notes of the black-throated blue, the insistent calls of the Tennessee and the blackpoll, the vivacious notes of the redstart and the chestnut-sided warblers fix themselves readily in our minds like the chirp of the cricket and the belated love calls of the katydid. They are expressive of the first green of gardens and hedgerows and the dark shade of northern forests, and when once learned they make the discovery and identification of the warblers a simple task, but no satisfactory method of transcribing them to paper has yet been found.

The nesting habits of warblers are as varied as their colors and present many surprises. Most birds nest where they find their food, so that one expects terrestrial birds to nest on the ground and tree-loving birds to nest in the tree-tops. One is not surprised, therefore, to find the nests of the oven-bird and water-thrush on the ground, those of the chestnut-sided warbler and the chat in the low bushes, and the Blackburnian warbler's in the tops of the evergreens. It is strange, however, that the black and white warbler, which spends its life creeping about the trunk and larger branches of trees, descends to the ground to nest as do also the Nashville and Tennessee warblers which we find most frequently singing in the tree-tops. The roofed-over nest, which gives the oven bird its name, the lichen-covered nest of the cerulean warbler, and the

cottony cradle of the yellow warbler, are, perhaps, the most unusual of the warblers' nests, the others being fashioned of grasses, root-lets, leaves, and other common materials into the ordinary cup-like form. The eggs of the warblers are remarkably uniform, being creamy-white, more or less spotted with brown, and it requires ten or eleven days for them to hatch. The young remain in the nest from eight to twelve days but are cared for by their parents for some time thereafter, since only one brood usually is raised in a season.

To the warblers is given the care of the foliage of the trees and therefore the good health of the forest. They are the tree doctors just as the woodpeckers are the tree surgeons. As long as the foliage is kept in good condition the trees will be healthy and produce good wood. Conifers will scarcely stand a single defoliation and deciduous trees are seriously devitalized even by a single stripping of the leaves. Never a year passes when sufficient caterpillars are not hatched to defoliate every woodland in this country, so prolific are the moths which lay



A CONFIDING CHESTNUT-SIDED WARBLER FEEDING ITS YOUNG
Many of the warblers are apparently without fear of man and do not hesitate to feed their young even when held in the hand.

the eggs. It is possible and practical, nowadays, to spray the shade trees of city streets and thus protect them from these pests, although it is always an expensive process, but it will never be practical to spray entire woodlands. We must continue to rely upon the protection which birds give. Chief among these arboreal guardians are the warblers, and the thoroughness with which they do their work can be proved by any one who will observe a tree infested with the canker worms, aphids, gypsy moths, or almost any other pest of the foliage. Once the migratory troops of warblers discover it, they will remain about it for days, new birds frequenting it all through the migrating season, until the caterpillars become so scarce that they are difficult to find. The number consumed by a single bird seems almost incredible, but much careful and accurate information has been accumulated by E. H. Forbush, the State Ornithologist of Massachusetts, giving actual numbers consumed, which attest the tremendous economic importance of this family.

Mr. R. H. Coleman counted the number of insects



"WOOL GATHERING"

The yellow warbler and the redstart can be encouraged to nest in the garden by supplying them with nesting material. Here a yellow warbler is taking some cotton that has been put out for it.



A CANADIAN LUNCHEON

A Canadian warbler bringing a crane fly to its young. The Canadian warbler is one of the common warblers of the north woods.

caught by a palm warbler and found that it varied from forty to sixty per minute. The bird observed spent at least four hours at the task, and in that time must have gathered almost ninety-five hundred insects.

Mr. F. H. Mosher observed a pair of yellow-throats feeding upon the aphids on a gray birch. One of the birds took eighty-nine of these tiny insects in a minute and 3500 in forty minutes. A chestnut-sided warbler was observed to take twenty-two small gypsy moth caterpillars in fourteen minutes, another, twenty-eight brown-tail caterpillars in twelve minutes, and a Nashville warbler ate forty-two caterpillars in thirty minutes, together with some other insects not identified. Many other observations could be listed, but the foregoing will give some idea of the good work the warblers are ever doing. While it is

true that the warblers and most birds do not like the large, full-grown, hairy caterpillars, they destroy them while small in great numbers, and such disagreeable species as tent caterpillars and tussock moths are relished, even in the adult stage, by cuckoos and orioles. If we should list all of the insects that have been taken from the stomachs of warblers, in the economic studies of the biological survey, they would run nearly the entire gamut of insect life.

Fortunate it is that the country is at last awake to the value of birds, that Federal laws for their protection have been enacted, and that we are learning to appreciate them not only from the economic standpoint, but also for the beauty and pleasure which they bring into life.

MINING "CLAIMS" IN THE GRAND CANYON

BY H. H. CHAPMAN

A GREAT victory for public ownership has recently been won by court and departmental decisions, which will have a far-reaching effect in protecting public rights in all of our National Forests and Parks, and especially in the Grand Canyon. This is, in effect, that fraudulent mining "claims" or locations can no longer be occupied and held in defiance of authority and for purposes other than those contemplated by the mining laws.

There are many mining claims in the Grand Canyon, locations made years ago, ostensibly for mineral, but in reality covering portions of the canyon rim and trails in such a way as to give the claimants control of land to which the public should have access, hence carrying with them the chance to levy tribute on the tourist.

Mining claims can be filed on any public land, including National Forests, but not upon lands withdrawn as National Monuments, or National Parks. A claimant does not own the land until he "proves up" and gets a "patent," but the claim, if valid, does give him the right of exclusive possession, which is a property right, enabling

him to interfere with or prevent the public access and use of his claim. The statute reads, "no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located." Locations made where no mineral exists are fraudulent.

Before the creation of National Forests there was no incentive on the part of the Land Office to investigate the validity of mere mining locations. The claimant could maintain his rights for an indefinite period by doing a specified amount of work annually—termed "assessment" work—until he chose to bring the claim up for patent. The Land Office then examined the claim and if mineral was present in paying quantities, title or patent was issued.

But as soon as the National Forests were placed under proper administration, the officials in charge found that their management of the Forests was being greatly handicapped by the filing of numerous "lode" or "placer" mining claims covering the choicest bodies of Government timber, preventing timber sales and threatening the integ-



ON THE RIM OF THE GRAND CANYON

In the middle foreground is the Hotel El Tovar. Near it is the home and business place of the Kolb Brothers, and along the rim are numerous sites of mining claims.

city of the forest policy. They appealed to the Land Office, upon which rests the responsibility for passing upon the validity of claims to title, requesting immediate examination of those claims to determine whether or not there was mineral present. Perhaps certain advertisements appearing in California papers offering mining claims for sale and guaranteeing that they would "assay 12 sugar pines per acre" hastened this action.

Urged by this necessity, the Department looked up the precedents and decided that it was entirely within the authority of the Secretary to investigate the character of a mining claim at any time, without waiting for the claimant to seek a patent. It is generally known that but few claims filed are ever patented, and that in thousands of cases the claimants' rights are kept alive for many years by complying annually with the assessment requirements; hence in the absence of such authority, the Government would be powerless to interfere with a mining claim regardless of whether it is valid or fraudulent. This new policy was clearly set forth in a Department decision in the case of *H. H. Yard, et al*, 1909, in which the right to examine such claims at any time was announced.

A few of the most troublesome mining claims in the Grand Canyon were the property of one R. H. Cameron. The Canyon lay within and was a part of a National Forest. In order to protect this area from encroachments under the mining and other land laws, the Canyon was withdrawn in 1908 as a National Monument, and the Department held a hearing on several of the Cameron claims to determine their validity. The evidence showed that no mineral had ever been discovered on these claims; and under the precedent established by the Yard case, they would have been cancelled.

But at this juncture, the entire policy of the Interior Department was overturned by a new decision touching this very question. Two mining claims located by J. B. Nichols and Cy Smith on the Wallowa National Forest in Oregon were challenged by the Forest Service as fraudulent and intended for uses not contemplated by the

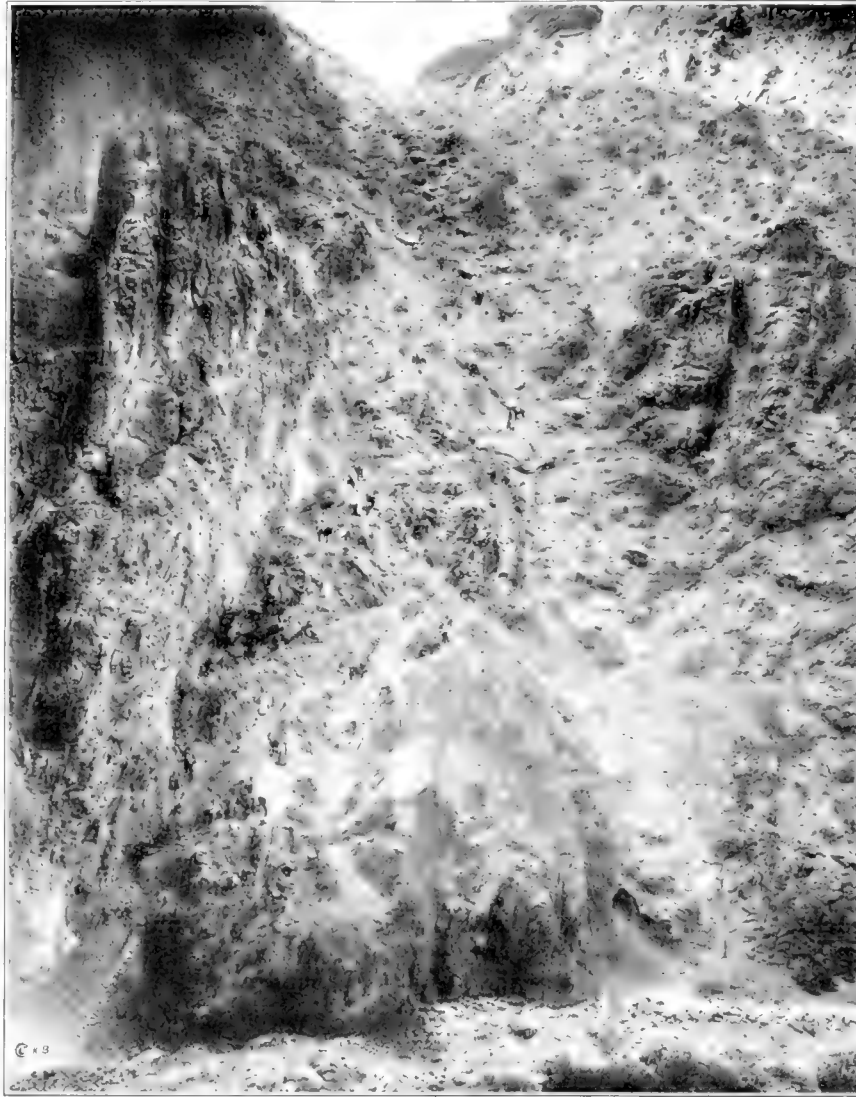
mining laws. The Land Office examined and cancelled the claims. But when this case was appealed, the decision which was rendered declared that the Department had no authority whatever to interfere with a claimant until he chose in good time to bring up his own case for patent, and that questions of the validity of such claims must be settled in the courts. This revolutionary decision was rendered in 1913.

The owner of the Cameron claims in the Grand Canyon was quick to seize the advantage thus offered and throw the case into the District Court of the District of Columbia at Washington, which court, acting upon the decision of the Interior Department, upheld the claimant.

Owing to the gravity of the issue involved, the Secretary permitted the case to go to appeal in order that the courts might be permitted to pass upon the policy of his subordinates, and settle the question. The courts soon spoke and in no uncertain terms.

In September, 1915, Judge Sawtelle of the District Court of Arizona refused to Cameron an injunction against the Department of Interior, and denied that the courts had any jurisdiction in such cases.

In December, 1916, the Court of Appeals of the District of Columbia upheld this view in case 2971, *Franklin K. Lane, Secretary of Interior, vs. Ralph H. Cameron*, and placed the responsibility of protecting the public against fraud squarely on the shoulders of the Depart-



THE DEVIL'S CORKSCREW

In this picture are shown the holes dug in prospect work by some of the men who established mining claims. If their claims were declared legal and the land became theirs they could charge tolls to the tourist who descended into the Canyon.



FINISHED ROAD OVER A MINING CLAIM

In the immediate foreground the road is part of one of the mining claims on the rim of the Grand Canyon.

ment, reaffirming the principles announced by this Department in the Yard case in 1909, which had been overturned by the Cy Smith decision in 1913.

As soon as this court decision was rendered, the Interior Department issued an order restoring the rights and responsibilities of the Department as declared in 1909.

It is significant that this latest decision cites numerous convincing precedents, including a clear-cut opinion rendered by the Supreme Court of the United States (Knight vs. U. S. Land Association, 142 U. S. 161) in which Justice Lamar says: "The Secretary (of the Interior) is the guardian of the people of the United States over the public lands. The obligations of his oath of office oblige him to see that the law is carried out, and that none of the public domain is wasted or is disposed of to a party not entitled to it.

. . . The mode in which supervision shall be exercised in the absence of statutory direction may be prescribed by such rules and regulations as the Secretary may

adopt. It could not be a sufficient answer against the exercise of his power that *no appeal* had been taken to him and therefore he was without authority in the matter. The Secretary is given the superintending and supervisory power which will enable him in the face of unexpected conditions to do justice."

These same convincing precedents had been cited in 1909 in the Yard case, yet they were swept aside for three years by the influences which placed the rights of individuals to acquire private title to lands in public reservations as paramount to the rights and welfare of the public or the responsibilities of the Department to protect those rights. But the Department of Interior, encouraged by the vigorous stand taken by the courts, has now, at last repudiated the Cy Smith decision and is free to deal with fraudulent loca-



THE LINE OF A MINING CLAIM

On this road around the Grand Canyon the portion finished by the Government, and the unfinished section on the only mining claim where the road is uncompleted, are plainly discernible.

tions in the Grand Canyon or elsewhere. The control of the Grand Canyon is now secure forever to the people of the United States.

THE report covering the spring and fall forest fire seasons of 1916, issued by the Pennsylvania Department of Forestry, shows that while almost as many forest fires burned in Pennsylvania in 1916 as in 1915, the area burned over was less than half that of 1915, and the timber loss was only a trifle over one-fourth as large.

THAT mine timbers of white spruce, Sitka spruce, white birch, and western hemlock grown on the Chugach National Forest, Alaska, are fully as good as Douglas fir from the Rocky Mountain region and are superior to other Rocky Mountain species for use as mine timbers has been demonstrated by the Forest Products Laboratory at Madison, Wisconsin.

FOOD-PRODUCING TREES

BY J. RUSSELL SMITH, PH.D.

PROFESSOR OF INDUSTRY, UNIVERSITY OF PENNSYLVANIA

HERE is a hybrid idea in search of a father. I seek not its creative father, but rather adoptive fathers who may take the hybrid idea and give it such fathering and fostering as it may merit. The idea itself is a hybrid between horticulture and forestry. It might be called fruitful forestry, if the foresters would not take offence. It is nothing worse than the production of food and wood on the same tree.

We have now reached the state in our industrial development when we need large areas of land put to trees that will produce many crops of useful fruit, nuts, beans, or other annual or occasional product before the final crop of wood. It is merely the intensification of tree culture that shall parallel the intensification of animal husbandry. In Australia, in the early days, cattle were reared for their hides and tallow, all else being thrown away. Then came the export of

meat, and lastly the daily crop of milk and its derivatives for several years before the final crop of meat. The wood of a tree is no poorer for the fact that it has supported fifty or a hundred crops of nuts, fruit, or beans.

I hope I may not cause any one to miss the main point by rousing questions of definition as to whether I am talking about horticulture or about forestry. My greatest delight would be for both foresters and horticulturists to adopt the idea and act on it. I have the notion that the forester has been missing great opportunities and has been limiting the field of his usefulness when he thinks of trees merely as producers of wood. Similarly, I think the horticulturist has been grossly neglecting opportunities when he has limited his energies to the production of crops for men to eat. Both forester and horticulturist have been too bashful. The great need of American agriculture to-day is not primarily things for men to eat, but things for the beasts to eat. Our domestic animals eat many times as much as we do, and trees, whether attended to by horticulturist or forester, can undoubtedly be made to yield vast amounts of forage if care

and attention are directed to that object. I suppose most foresters are aware of the fact that half or two-thirds of the entire weight of pork grown in Portugal is produced by the acorns of the cork oak and evergreen or ilex oak. There are many other trees that might join the oaks and make a series of crops that would supply a surprising proportion of the needs of domestic animals, especially swine and sheep.

With this idea of tree crop forage in mind, and with the added fact that with the rising price of meat we are steadily increasing our consumption of nuts and are importing them by the millions of dollars a year, it becomes evident that foresters have been giving us, particularly farmers, bad advice in merely advising us to raise wood. There is little doubt that this idea of fruit harvests as well as wood harvests should have its proper place of beginning on the farmers' woodlot.



A GIANT GRAFTED OAK

This tremendous oak stands in a garden in Majorca. It produces a crop of acorns which provide food for a number of pigs.

Over and over again I have heard the foresters' advice to the farmer to "plant his steep hillsides in trees." The hillsides need the trees but the advice as given is often bad for two reasons: (1), the process is so slow that the farmer is not reached by appeal; (2), the yield is so small that the farmer can't afford to put part of his small acreage into this low and slow form of production. Instead of being told to plant trees and wait until they die to get something, he should be told to plant trees that will yield annually, or certainly every other year, and then finally a crop of wood. With this advice, the chances of getting him to plant his hillside into trees are greatly enhanced, because he can begin to profit in three, five or ten years instead of waiting twenty-five or fifty or seventy-five.

CROP TREE AREAS AND WOOD TREE AREAS

I am not advocating that all forests should be of harvest-yielding trees. We need the utilization of land in the many ways which combine to the best service of the nation. Some lands should be in wood-producing forests only. These lands, however, should be those which have from man's standpoint some climatic handicap. Unfor-

unately there are plenty of such lands. Lands with first-class climate are too valuable to grow mere wood. Some part of our country to the South, as indicated by climatic studies,¹ as well as by history and present development, seems not to have a first-class climate for the development of numerous, vigorous, energetic and healthy men. Here timber should be grown. Certain parts of America are too cold and have winters too long for the easy support of large numbers of people. Here also timber should be grown up to the limit of trees. But in that large middle



NOTE THE COMPARISON

On this ground, twenty miles north of Seville, Spain, is seen on one side of the fence a fire-desolated goat pasture, on the other grain fields interspersed with oak trees producing forage for fattening hogs.

territory of which the United States has so much, and Canada has some, where it is neither too hot nor too cold, where the malaria does not prevail, and the climate stimulates man to activity, and climate permits production, there land should be made to feed him in the largest numbers. There trees should not loaf their lives away. Under the present system of land utilization most of Appalachia with its splendid climate has no economic future except in forests. Present tillage for it means destruction through the gulley. Yet we have the very stimulating example of Corsica where similar mountain slopes as steep as a house roof and even steeper are clothed for miles in a continuous expanse of trees which look strangely like a forest, yet every tree is a grafted chestnut. Every acre is as valuable as good corn land in Indiana, and scattered along the magnificent macadam roads are the substantial stone villages of the numerous population that supports itself in comfortable prosperity from the combined income of chestnuts, chestnut wood, and the by-product of pasture and a small garden patch. The chestnut industry has continued in Corsica for centuries. Certainly the earth offers few examples of agriculture so permanent, so automatic, and so easy. When a Corsican gets pushed for money he goes out and cuts down an old giant worth often from \$10 to \$25 in American gold.

¹ See Ellsworth Huntington, *Climate and Civilization*.

There are many crop trees that may rival or equal the chestnut. Such utilization of our hills and mountain slopes would increase rather than decrease the tree area of much of the hilly part of our country and at the same time give the needed soil conservation, the needed water conservation, the needed scenic effects, and the spiritual comfort of the great trees.

MAKING OVER THE WILD TREES

It should not be forgotten that the thing I am advocating is quicker than forestry. The man, even the young man, who plants an oak tree has little reason to expect to live to utilize the timber from its trunk. Yet it is a fact that most of our oaks have specimens which will bear fruit in from three to seven years when grafted upon the suckers growing up around the stumps of their own or allied species. Thus, instead of having the forest fire follow the lumberman, he should be followed by the tree grafter, converting mediocre oaks into prolific oaks, mediocre hickories into good shag-barks, wild persimmons into fruitful persimmons, average black-walnuts into those few



BEARS 1200 LITERS OF ACORNS YEARLY

The food value of the annual crop of this evergreen oak tree near Algarve, Portugal, with its spread of fifty feet, is indicated by its record production of acorns.

excellent ones that will furnish kernels in whole quarters, ever-bearing mulberries in place of the prolific but quick-ripening wild variety. All the above kinds of grafting are from present knowledge known to be feasible.² I have taught ignorant mountaineers how to do the whole lot except the oak, and that is a common practice in English parks and gardens.

This process of establishing crop trees need not be limited to the conversion of wild trees. Many of the fruit-yielding trees are easy to transplant, and some of them yield quickly, especially the mulberries, which fruit wild at the height of a man's head, while specimens of the selected "ever-bearing" varieties will actually bear in the nursery row. The mulberry is so highly prized by the pig,

² See reports of Northern Nut Growers' Association, W. C. Deming, Secretary, Georgetown, Connecticut.

so easy to transplant, so prolific, that it is probably the easiest point of approach to the farmer who wishes to experiment along these lines.

The practice of the Corsican mountaineers in their tree crop agriculture or fruitful forestry, whichever you choose to call it, is very suggestive of a proper method of handling the technical question of getting a stand of trees and keeping it, and at the same time utilizing the by-product of pasture. The Corsican goat, whose milk makes much good cheese, browses in the chestnut forests and keeps down most of the undergrowth. When a Corsican sees a chestnut tree which in five, ten, or twenty years is likely to be ready to go to the pulp mill, he goes off to his little nursery, digs out a ten-foot chestnut, and plants it near the one which it is to succeed. He puts two stakes beside it to keep it from being ridden down by the goats. When it is established in two or three years, he grafts it, and there it stands leading a submerged kind of life for five or twenty or thirty years. But when the old monarch by which it stands finally comes down, it is ready to spring promptly into rapid growth and the fullest possible utili-



PRODUCTION OF MULBERRY TREES

This grove on a Carolina farm is producing posts, firewood, and an estimated crop of twenty-five dollars' worth of pork each year. The Everbearing variety feeds the pigs for two months.

zation of the vacated light, space and fertility. It is true that the natural way to propagate a chestnut is to graft the suckers that grow up around the stumps, but the Corsican finds it is quicker to have the understudy tree established in advance. This method also saves the necessity of protecting the suckers from the merciless teeth of the ingenious and industrious goat.

FRUIT AND LIGHT

Perhaps some forester, if he has read this far, has raised the objection that to produce timber, trees must be tall, to be tall they must crowd, and crowding cuts off light and limits fruit. I at once grant all this. To make the tree yield the best amount of fruit, it must have light on all the ends of its branches, a fact which the Corsican knows well and practices carefully.

But just here I wish to call attention to the fact that the primacy of the saw log is passing; we are ever finding more uses for our wood in the form of pulp, and I will be glad to hear from any forester who can give me actual figures on the relative yield of total wood per acre on a crowded stand of tall timber and the open stand of well-lighted trees capable of yielding fruit. This comparison, if it is really to test out my point, should be made of fruit-yielding trees growing in conjunction with some form of



WILD OLIVE TREES IN ALGIERS

The land not only furnishes sustenance to these revenue-producing trees but also excellent grazing for the numerous sheep seen browsing there.

leguminous nurse plant, either leguminous bushes or leguminous pasture plants.

LEGUMES TO FEED THE OTHER TREES

Here is a simple device which has been little used, but which has great possibilities. It is well known that the legume, gathering nitrogen in the tubercles on its roots, can share it in that same season with a non-leguminous plant growing alongside. This has been shown by experiments that reveal much higher protein content in non-leguminous plants growing in a mixed stand with legumes than in the same species growing without legumes. There are many legumes which, granted lime and phosphorous, will riot in the half-shade and interspaces of trees that are so spaced as to produce fruit. One at least of these legumes, the ordinary yellow locust tree (*Robinia pseud-acacia*), is one of the surest land improvers I know. In 1904 I planted an apple orchard in an abandoned field that had in it some locust thickets. In four years' time the trees that stood near the stumps of the leguminous locusts were two or three times as big as the others, and in thirteen years they have not lost their lead. Similarly I find that the persimmon, that goat among trees, capable of surviving on such starved land as the cotton farmer abandons, also waxes near the locust tree.

I submit that the locust is a very admirable nurse plant for such non-leguminous fruit trees as the chestnut, walnut, hickory, pecan, persimmon, mulberry. It need not be allowed to grow up and shade them. The tree will

live and make roots and survive an annual cutting even in August. In fact, I have been nearly driven to despair by seeing the way they have survived where I have attempted to kill them by ten consecutive August cuttings. But there is an easier way of keeping them down and yet keeping them alive. Turn in every winter or every other winter a bunch of goats. They will gladly peel the bark from every locust bush, permitting it to start again which it will cheerfully do *ad infinitum*, thus keeping the ground full of nitrogen and humus, furnishing nitrogen for some nearby big fruit tree and furnishing winter forage for goats. The fact that these trees are much beset in some localities by borers will rarely cause their complete extermination, but merely make them less of a menace to the tree they are intended to feed and not to shade.

Fortunately we do not have to depend on more self-perpetuating and continuously murdered trees, or even the clovers, to get this leguminous nitrogen supply. The honey locust tree is one of the most promising of fruit-yielding trees for the reason that it possesses two excellent qualities: (1) it is a timber tree of high order; (2) its nitrogenous and also sugary beans are much prized by cattle, and have an analysis value which would give them, in the ground form, a market value approaching that of corn, and

a nutritive value so high in protein as to make the meal a rival to wheat bran. It is a close duplicate to the carob bean meal of the Mediterranean and of American patent stock foods, and to the mesquite bean meal which is becoming so important in Hawaii. This honey locust, with its good timber and good beans, could therefore be interplanted with walnuts, hickories, persimmons, pecans,

mulberries, or other non-legumes all of which love the nitrogen, and thus the land could have two crops and at the same time be bringing forward timber trees of the highest quality.

The honey locust tree is a heavy yielder of beans. A specimen growing in my neighbor's yard yielded 350 pounds in 1912, and I have heard of higher records. The tree survives much aridity, grows on the plateaus of western Kansas, Western Colorado, and joins territory with the mesquite, whose nutritious beans have fed cattle, deer, antelope and Indians for centuries. Between the honey locust species and the mesquite genus we have a good forage bean tree that will grow over at least 2,000,000 square miles of the United States, an undeveloped resource of amazing possibility, and one that requires immediate experimentation by forest experiment stations and farm experiment stations.

For increase of fruit areas, there is a compromise method which may appeal to the forester because it gives a crop of wood and at the same time brings us to the possibility of quick, cheap, easy, and effective fruit production. I have in mind the habit of the tall slim forest-grown trees which when left in clearings throw branches down their erstwhile bare trunks and make of themselves tall cylinders of foliage, affording the maximum possible leaf surface ex-

posed to the sunlight, and at the same time a long log in the middle which will at least make second-class lumber, strong. This habit of feathering their long bare legs is part of the equipment of the chestnut, the walnut, the oak, and probably many other trees, and if the trees did not do it naturally themselves, it could doubtless be induced by a few well-placed strokes of the hatchet.



PORTUGUESE CORK FOREST

The thrifty trees in the background yield a large revenue, while the harvesters in the foreground thrive upon the auxiliary crop of acorns.



IS THIS A FOREST?

This is a view on the Sorrento Peninsula, Italy. Every tree seen in the photograph is a food tree. In the foreground are walnuts and in the background olives.

To use this device effectively, logged-over land that is to grow up again could be grafted to choice varieties which, with a little care, could be permitted to grow up tall and straight with the other timber. I have seen the Paragon and other grafted chestnuts do this. When merchantable pole size had been reached, all timber could be cut, but the grafted trees which, with their height of 30 to 60 feet, would at once start to bearing useful crops, and, with the development of the side branches down their trunks, reach a high maximum of productivity in a few years.

FRUIT IN THE ORTHODOX FOREST

It is not necessary for all of this article to be heterodoxy. There is one place where I can be orthodox, and urge the foresters to keep any definition of forestry they want and still have other crops than wood. Plant the cork oak tree. We undoubtedly have a large area with suitable climate, judging by the ability of this tree to survive and reach its best in poor and rocky lands in the Iberian Peninsula as well as to thrive in experimental plantings over a wide area in this country. The argument that springs to so many persons' minds, namely, the Old World with cheap labor, does not hold in connection with the cork oak, in which the number of days' labor for stripping a ton is very small, and the value per ton high and increasing with our increased demands for it. I may say, from some examination of cork-producing areas in Spain, that there is very little increase in output promised in that country, and those responsible for American forests will do well to plant considerable areas of it.

In its home land cork forest makes a considerable part of its income by feeding swine with acorns. I want to call attention to the apparently easy possibility of having a cork oak tree as far up as we want to raise cork, and grafting an evergreen (ilex) oak at the top. This latter tree, with its greater acorn qualities will undoubtedly increase the yield through acorns, and there is no apparent theoretic reason why it should hurt the cork. The general practice of grafting oaks is not difficult, and I have been told by Spaniards of successful inter-grafting between these two species. The work would not be extensive if the Barcelona type of cork tree, namely, the straight

trunk, were favored, while the Portuguese shape with four or five branches would not require an unreasonable amount of grafting. An even simpler process for the getting of desired types of oaks on large areas would be the planting of oak forests, using seed that would come true to type of desired strains. I have been told by the plant breeders that it would be a comparatively simple matter to get

such strains of acorns, and the time involved would not be so long as first thought would suggest if one would follow some such device as this. Select the desired strains, hybridize them, sprout the hybrids, test them by grafting on mature trees so that in a comparatively short time the true yielding strains could be found, and then these could be grown in some isolated spot where no other oak trees nearby could cross fertilize. Such spots might be found in islands like the Catalina Islands, in isolated places in evergreen forests, or say out in the great plains. In fact the opportunity of establishing such botanic islands is very great.

PROGRAM

Apparently the steps in the development of this piece of work should be somewhat as follows:

1. Search for and test of new useful species, such as the honey locust, which is yet nowhere a crop.

Another example of this possibility is the osage orange, a magnificent timber tree producing heavily of big fruit from which undoubtedly we could extract a number of useful things if we handled them in carload lots. I have been told that they contain starch.

The list of trees valuable for both wood and fruit is doubtless large, especially if we consider the possibilities from the best tree of the species, and of breeding from a selection of such trees. That brings us to the second part of the program.

2. Search for good parent trees.

We know that the persimmon is a tree capable of thriving in a field that is so poor as to be "thrown away." All over the territory below Mason and Dixon's Line, and in some places above it, we know that it is a heavy yielder of fruit, that it is the most nutritious fruit grower east of the land of dates, that it is prized by pigs, sheep, horses, cows and humans, that it grafts easily, but we do not yet know where are the best parent trees. The recent



SUCKERS OF SCRUB OAK

These, locally known as "turkey oak," grew in thirty months on a very poor sandy soil over which a forest fire had swept. The soil was of Cambrian sandstone formation on the crest of the Blue Ridge Mountains near Bluemont, Virginia.

discovery of the finest pecan in America, growing in Indiana,³ is again suggestive of the lack of botanic exploration in this country, especially economic botany. There are shag-barks that will come out of their shells in whole halves. The same is probably true of black walnuts. Where are the best of these parent trees? There are doubtless mazzard cherry trees with kernels in their seeds

ing and resistance to pests. The tree world is to the botanist as clay in the hands of the potter and the botanist has scarce begun. I hope that the ensuing years may see a vast increase of constructive work looking to the fuller utilization of our tree resources as a factor in production and conservation.

EASTERN FOREST LANDS BOUGHT

THE National Forest Reservation Commission has authorized the purchase by the Government of 32,266 acres of land in the Southern Appalachian and the White Mountains, for inclusion in the eastern National Forests. In accordance with the policy of the Commission, only tracts were approved which block in with the land already owned or acquired in the established "Purchase Areas."

The largest and most important purchase is that of a number of tracts in Lawrence and Winston Counties, Alabama, which total 14,360 acres. The Alabama Purchase Area was authorized two years ago in order to protect the headwaters of the Sipsey River, an important tributary of the Black Warrior River, on which an expensive system of locks has been installed by the Government to facilitate navigation. Within the boundaries of the Purchase Area and adjoining the tracts just approved there are approximately 13,000 acres of rough mountain timberland to which the Government still retains title and which have been withdrawn from entry for inclusion in the National Forest.

A total of 11,116 acres in Oxford County, Maine, and Coos and Carroll Counties, New Hampshire, in the White Mountain National Forest, was also approved. Of this amount about 7,000 acres was comprised in a single tract on the Kilkenny Division. Other tracts whose acquisition was authorized include 998 acres in Caldwell, Henderson, Macon, McDowell, and Yancey Counties, North Carolina; 954 acres in Shenandoah and Amherst counties, Virginia; 600 acres in Oconee County, South Carolina; 738 acres in Randolph County, West Virginia; and 3,500 acres in Monroe County, Tennessee.

NEW uses for wood are being developed constantly, but the first wooden tennis court of which there is any record has been built at the country home of E. B. Hazen, who lives several miles from Portland, on the Columbia highway. The tennis court is built of inch pieces, three inches wide, set on edge, and sufficiently close together to make a solid floor, yet sufficiently spaced to give ventilation and allow the water to run off without gathering and promoting decay.

THE day of the wooden golf club shaft is not passing. There is enough hickory in America to provide all the shafts for the golf clubs that American golf players can want for years to come. It has been asserted of late that the time was coming when, from scarcity of hickory, club shafts would have to be made of steel, but there is no foundation for such a statement.



A GRAFTED PERSIMMON TREE

This tree, burdened with fruit, is standing where it sprung up by chance in a Georgia cow-pea field. Peas and persimmons are both gathered by foraging pigs.

big enough and nutritious enough to make them a crop for pig feed, but no one as yet has taken the pains to search them out or make tests.

3. Finally comes plant breeding, and its possibilities when applied to the native and imported fruitful trees growing in America are quite beyond adequate contemplation. The well-known experiment of Dr. Van Fleet with the chestnut is, however, so suggestive as to merit a brief rehearsal. By using the useless, small, but very sweet chinquapin, and the large, prolific, Japanese chestnut, useless because of its poor quality, he has produced a hybrid good enough to eat, big enough to handle commercially, and with two added highly useful qualities: First, high immunity to the ravaging chestnut blight and such prolificacy that the seedling will sometimes bear eighteen months from the sprouting of the seed. That does not agree with our ideas of the slowness of nut trees, or the slowness of tree breeding. It should be remembered that trees are individuals, and that they vary in almost all respects, such as speed of growth, flavor of fruit, size of fruit, abundance of fruit, frequency of fruit-

³This is the Posey. It was awarded the prize at a Mobile meeting of the National Nut Growers' Association, an organization practically limited to southern pecan growers.



UNITED STATES FOREST SUPERVISORS AT DENVER

The spirit of public service shown by such men in their work has brought about the active cooperation and marked confidence of the citizens with whom they come in contact, which is a distinct aid in the Government's policy of forest conservation. The names of the Forest officers in the photograph are: A. L. Sweitzer, James F. Conner, John W. Spencer, C. A. Neeper, Earl S. Peirce, Chas. Farr, Jay Higgins, Fred B. Agee, R. W. Allen, Ray Peck, James A. Blair, J. W. Langworthy, C. L. Cecil, Lee E. Cooper, Geo. A. Duthie, Grover C. Hougham, M. J. Sweeney, Lynn H. Douglas, Arthur T. Upson, Alva A. Simpson, Peter Keplinger, Steve Doering, John McLaren, H. H. French, O. R. Craft, A. G. Hamel, Earl B. Tanner, C. M. Granger, John W. Lowell, John H. Hatton, Wm. O. Sauder, Fred R. Johnson, James Blackhall, Leslie Brownell, T. V. Venemann, P. G. Redington, H. N. Wheeler, Arthur M. Cook, M. W. Thompson, Gordon Parker, W. J. Barker, Wm. R. Kreutzer, R. E. Clark, H. L. Borden, A. F. C. Hoffman, H. C. Hilton, Paul D. Kelleter, Dwight S. Jeffers, C. G. Poole, P. J. Paxton, Smith Riley, E. W. Tinker, Crosby A. Hoar, W. J. Pearce, F. H. Carroll, Fred W. Morrell, Theo. Shoemaker, J. B. Cammann, Ress Philips, G. E. Marshall, Chas. Gosorn, H. Earl French, Sanford Mills, W. I. Hutchinson.

THE NEW SPIRIT OF PUBLIC SERVICE

BY C. J. STAHL

IN the early-history days of the National Forests in the West, the administration of the then so-called "Timberland Reserves" was carried on by a small force of officers whose duties consisted largely of fire protection, construction of improvements and timber sale reconnaissance and inspection, and who were obliged to refer practically all matters of importance to the Washington headquarters for decision. In time, this system of central control, which was found to result in delay and dissatisfaction to Forest users, was replaced by a scheme of local management in which the business of the National Forests was entirely handled by individual Supervisors under the direction of District Foresters with headquarters conveniently located as regards the geographical distribution of the Forests.

Today, as a result of this new system of management, a marked change has taken place in the West, both in the understanding of the Government's conservation policies and the feeling on the part of the public towards the National Forests and the men of the Forest Service. You find it everywhere—this spirit of "partnership," of lending a helping hand to the "other fellow," and it may be truly said that no body of Government officers in

the country are now more looked up to and respected than the men who carry the burdens of administration of our National Forests.

"What has brought about this change?" you may ask. The answer is—the new spirit of public service, which carries with it a downright personal interest in all matters of State, community and public welfare, and nowhere has this new spirit ever shown to better advantage than at the Forest Supervisors' convention held in Denver, Colorado, recently.

Organization, efficiency and progress were the keynotes of the meetings. Not "what is the Government going to do for us?" but "what can we do to make the National Forests better known and more useful to the public?" were questions oft repeated by the Supervisors. Many men who in past conventions were able only to discuss local Forest problems or minor points of official procedure, were here to be found on their feet speaking fluently and convincingly on subjects of general public interest. To one who has watched the steady growth of the Forest Service during the past fifteen years, this conference marked the beginning of a new era which promises much of achievement and success.

The convention lasted six days and was attended by over sixty Supervisors and officers of the National Forests of Colorado, Wyoming, South Dakota, Michigan, Minnesota, and Nebraska. Twenty-nine National Forests were represented, and a wide range of topics closely related to the upbuilding of the West discussed. District Forester Smith Riley presided at the meetings, and each day was given over to the consideration of some particular branch of National Forest work, such as good roads and their relation to State and community development; organization and up-to-date business methods; opportunities for public service and educational problems for Forest Service men, etc.

Lectures on organization and efficiency were delivered by the manager of the Ford Motor Company's plant in Denver, the superintendent of the Mountain States' Telegraph and Telephone Company and the efficiency engineer of the Denver Tramway Company. Good roads problems were presented by officers of the Bureau of Public Roads, United States Department of Agriculture, and the subject of game conservation dealt with by the director of the Colorado Museum of Natural History. Other interesting papers were delivered by members of the Colorado Mountain Club and officers of the Boy Scouts' organizations.

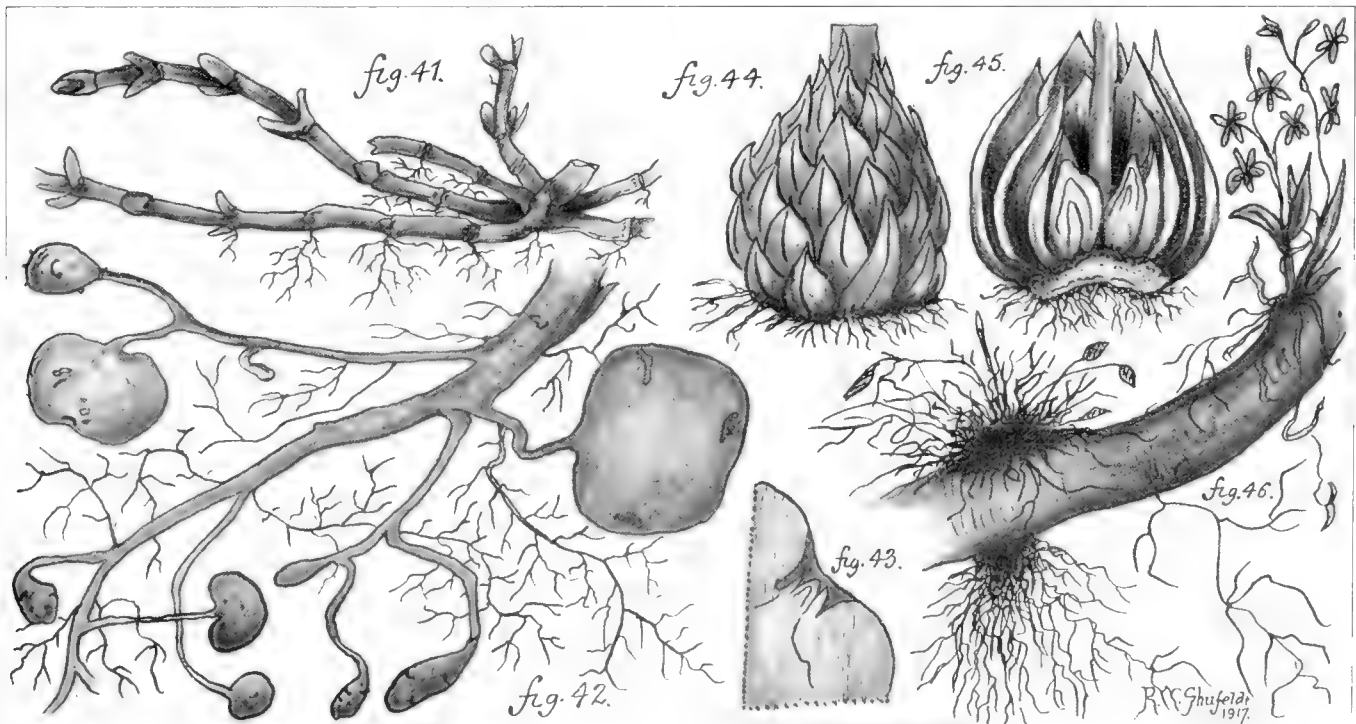
The possibilities for the development of the National Forests as great recreation centers; for the use of the poor man as well as the rich, was one of the paramount topics

of the convention. Figures were presented showing that the Forests of District 2 had over 667,000 visitors in 1916 and of that number the seventeen Forests of Colorado contributed over 600,000 visitors.

On one day of the convention the Supervisors made a special trip to Fort Collins as guests of the Colorado State Agriculture College. After inspecting the experiment station the men attended a series of lectures on various subjects connected with the grazing of livestock on the National Forests, delivered by members of the College faculty. The program concluded with a banquet in the evening.

During the convention in Denver the "get-together" spirit was fostered by a series of dinners at which prominent speakers addressed the Supervisors, and by social dances and theatre parties. At the close of the meetings resolutions were adopted commending and supporting the work and administration of H. S. Graves, Forester of the United States Department of Agriculture and Smith Riley, District Forester.

THE shortage of labor in the lumber industry is being felt even in the government operations on the Menominee Indian reservation at Neopit, Wisconsin. The supervisor, A. S. Nicholson, is having difficulty in finding two hemlock inspectors and a yard superintendent.



ILLUSTRATED GLOSSARY—FURTHER DESCRIPTIONS OF ROOTS

Figure 41, the rootstock of the peppermint; this is nothing more than an underground creeping stem. Such *rhizomas*, as they are called by botanists, are more generally known as running, creeping or scaly roots. From their manner of growth and structure of their stems, it is clear that they are subterranean branches, having joints or nodes with axillary buds at their points of union, with other evidences of branch structure. Such underground stems are extremely difficult to get rid of, and are therefore of great annoyance to the agriculturist and farmer.

Figure 42 illustrates the nature of a *tuber*, and shows the subterranean growth of the common Irish Potato, which gives every stage of an ordinary tuber. The eyes of the potato are merely axillary buds, and one of these is shown in section in Figure 43.

Corms, or solid bulbs have already been briefly touched upon and illustrated.

Another form of the corm is seen in the bulb, though the two plans of growth merge into each other. When perfectly typical, however, they are such growths as we see in the Canada Lily (Figure 44), shown on section in Figure 45. The thickened scales there shown are bases of leaves which are loaded with nourishment for the plant. There are hundreds of examples of such growths to be studied, being duplicated many times in fleshy plants.

Parasitic plants like the mistletoe grow upon other plants, and their roots draw sustenance from them. This, however, is not the case with certain air-plants or Epiphytes, for these live entirely upon what they get from the air. Two species of them are shown in Figure 46, the one with the flowers being the *Epidendrum conopseum*, and the other the "Black Moss" (*Tillandsia usneoides*); both are from our Southern States, and are very instructive plants to study.

SPRAYING WORK OF THIS SEASON

BY J. J. LEVISON, M.F.

FORESTER TO THE CITY OF NEW YORK

THIS is the time when all nature awakens. The insects awaken also, and we have to meet their destructive invasion. Just what to spray and what material to use is a matter that varies with the plant and the insect, and before one can determine what is needed, an effort should be made to receive specific advice based on the

the outer tissue of the leaf and suck the sap from the interior. To be effective against sucking insects, the chemical required must be of such a nature as to injure the insect by contact with its tender body. The various oil emulsions in the market, such as kerosene emulsion, lime sulphur wash, scalicide, miscible oil, fish-oil soap, and the nicotine and tobacco concoctions are all based on this principle. Which one of these to use and at what strength is a matter that varies with the season, the insect and the plant.

In dormant seasons one can use a stronger solution than in the summer time because then there is no likeli-



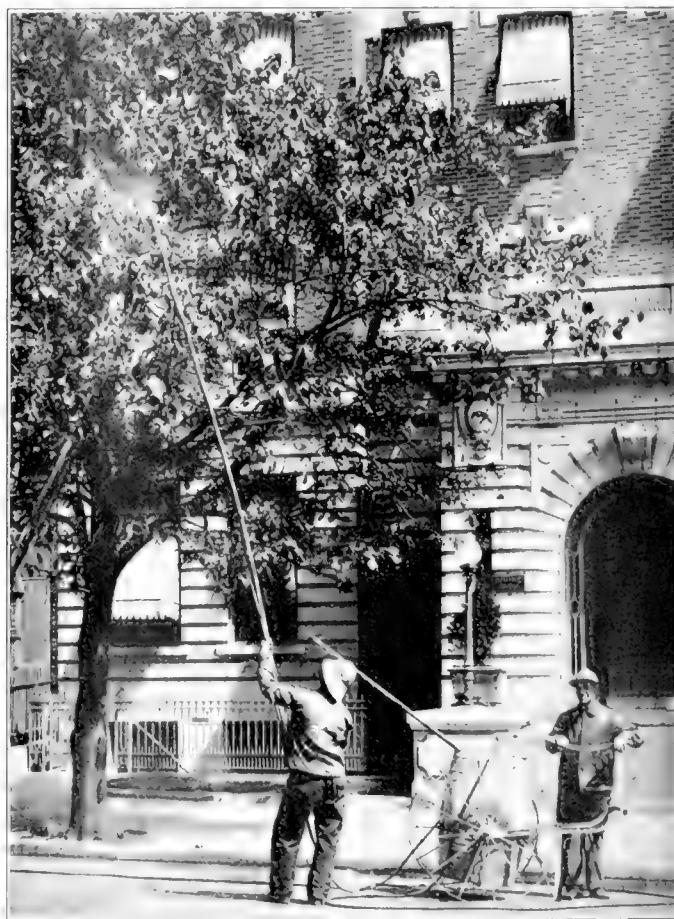
INJECTING CARBON BISULPHIDE FOR BORING INSECTS

The liquid is injected by means of a metallic syringe and the orifice clogged with soap to hold the fumes generated by the liquid within the burrow.

particular insect and the tree in question. Without considering individual questions, we can, however, to advantage discuss in a general way the important methods of spraying and how to combat some of our most serious enemies.

We spray for insects that either chew or swallow the leaves of trees or those that merely suck the sap from leaves or bark. A poison applied to the surface of the leaves will cause the chewing insects to swallow it with the leaves and become internally poisoned. Arsenate of lead serves that purpose and is most commonly used—at least more so than Paris-green, which is another poison occasionally substituted.

To combat the sucking insects, no such application of arsenate of lead to the surface of the leaves would ever reach the insects, because the latter penetrate through



HAND-POWER SPRAYING APPARATUS

This is a very convenient way of applying the spray to trees. More powerful gasoline sprayers are required where very tall trees are to be sprayed.

hood of burning the leaves or the open buds. In the dormant state one may also have to meet an insect heavily protected with an outer scale or possibly in the egg stage, and consequently requiring a stronger solution. The particular species of tree would also make some difference because some trees are more tender to oil emulsions than others.

With these preliminary remarks to put us on the right track, let us make up a simple spraying calendar which will hold good for the majority of cases of spraying during

the present season, though it may not cover the numerous specific troubles which we may also have to meet.

Spraying For Scale Insects.—While the trees are in dormant state, before the buds open, it may be advisable to spray for some sucking insects on fruit trees, and possibly on elms, poplars, willows, ash and lilac.

Some sucking insects, like the oyster shell and the scurfy scales, have their young emerge in May and it is advisable to take advantage of the tender state of these young crawling insects and to spray the trees at that time with an oil emulsion which will be more effective than if applied during the dormant season.

If kerosene emulsion is applied, it may be used at the rate of 1 gallon to 10 gallons of water before the buds open, or 1 to 25 gallons of water, after the buds have opened.

In the case of scalecide, it should be used 1 to 15 gallons of water before the buds open and 1 to 40 after the buds open.

In the case of fish-oil soap, about 1 pound to 10 gallons of water.

Spraying For Red Spider and Aphis.—During the month of May, it may be necessary to spray some of the evergreens, such as boxwood, etc., for red spider, and in that case one should use fish-oil soap at the rate of 1 pound to 5 gallons of water. The underside of the leaves of beech trees and Norway maples may be often seen affected with soft-bodied insects and in those cases the same treatment as for red spider is effective.

Spraying For Leaf Eating Insects.—During the latter part of May the elm leaf beetle becomes active on the leaves of the elm trees and the caterpillars of the Tussock Moth and other similar insects begin their work. For all such leaf-eating insects, one should spray the trees with

arsenate of lead at the rate of one pound to about 12 gallons of water.

Spraying For Mildew and Fungous Diseases.—Such spraying may be necessary on fruit trees, etc., and the application should consist of Bordeaux mixture or Bordo-

lead at the rate of 1 pound to 5 gallons of water before the buds open, or 1 pound to 10 gallons of water after the buds open. Never apply the Bordeaux spray while the trees are in blossom. Pyrox is another material often used effectively as a substitute for Bordeaux mixture.

A Few Practical Hints For All Spraying Work.—The following reminders during the spraying season may prove of value:

Examine your spraying apparatus and see that the nozzles are clear, that

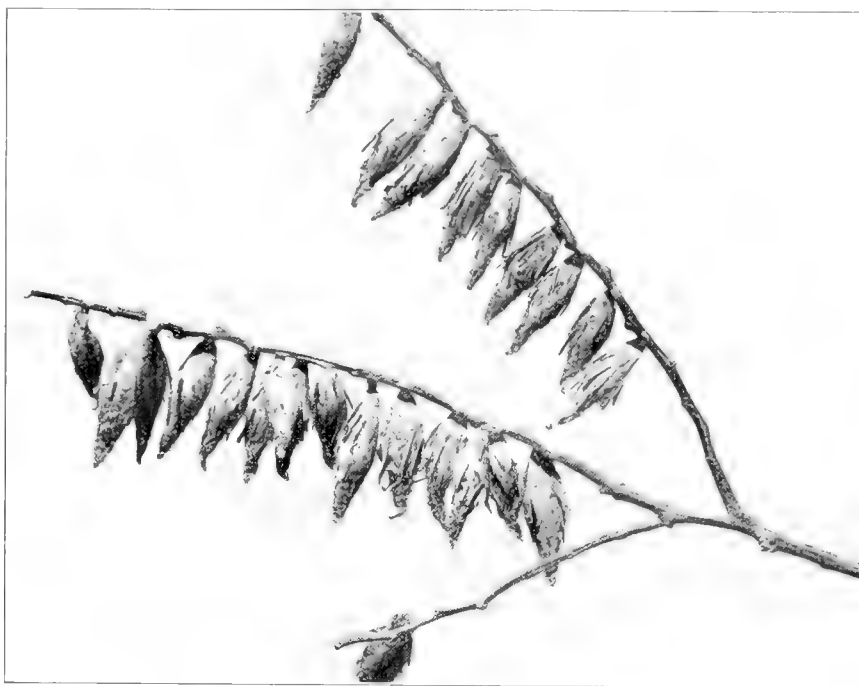
the hose does not leak; that the machinery works well. Always try to spray with a fine mist. Spray thoroughly, covering the leaves on the top of the tree as well as on the lower branches. The Tussock Moth and most of our other leaf-eating insects feed on the under side of the leaves and, therefore, all spraying for such insects must be applied to the under side of the leaves.

Keep the mixture within the spraying tank thoroughly stirred. Do not spray on a wet day or at a time when you anticipate rain.

Be more careful with contact poisons because too strong a solution will burn the foliage and tender bark, while arsenate of lead will have no such effect.

In spraying for sucking insects try to hit as many of them as possible because it is the contact of the poison with the insect that kills.

With the foregoing instructions one can get an idea what general spraying he has to do this month, and if any specific questions arise at any time one should take them up individually and obtain definite advice.



COCOONS OF THE BAG-WORM

This is merely one illustration of the many forms of winter nests of leaf-eating insects. Note how numerous they are on a single twig.

ADVICE FOR MAY

1. Plant evergreens during the first part of May.
2. Spray for all varieties of insects, including those kinds that chew, suck and bore.
3. Spray for fungous diseases.
4. Commence cultivating and watering trees and shrubs.
5. Complete the removal of trees hopelessly infested

with boring insects, such as the Hickory Bark Beetle, the two-lined Chestnut Borer, etc.

6. Examine trees in early May and see that they are free from eggs of the Tussock Moth, Gypsy Moth, etc., and from cocoons such as those of the Brown-tail Moth, the Bag-worm, etc.

QUESTIONS AND ANSWERS

Q. I am much interested in the question of the saving of the white pines, and in this connection I wish to take advantage of the offer, extended in your magazine, to answer helpfully any questions about trees. I own a good many acres of woodland on the shore of Sunapee Lake, and during the last few years have noticed at times a peculiar condition of some of the pines. About three years ago, and again in the spring of 1916, I noticed that some of the pines had tufts of brown needles at the extremity of the branches. At first only a few of the trees were so affected, but last year there were a good many more. In the one or two years between, I did not notice this condition. Is this the result of what you are now calling the white pine blister disease? I did not notice anything unusual on the trunks, and the main part of the tree did not seem to be injured. Nothing was noticeable except this dying of the tips. If it is not the disease in question will you tell me what it is, and whether it is harmful to the trees, and what should be done about it.

A. D., Wellesley, Massachusetts.

A. With relation to the condition of your pines, I do not believe that it is caused by the pine blister disease. Very likely it is simply due to a condition of drought which varies with the year and the season. There has been much of this during the past few years all over the East. There have also been of recent years several pests that worked principally in the terminal shoots of certain species of pine. We had the white pine weevil, destroying the leaders and tips of white pine trees, and the pine shoot moth, attacking Scotch and other pines. Just what your trouble is can best be told by submitting to us a sample of the affected branch and letting us examine it.

Q. We have a suburban home place and would like your advice about the best trees and shrubbery to plant. We have two catalpas, a hedge and some miscellaneous bushes and some fruit trees that are not doing much. I want to plant some hardy shrubbery and also some trees that will produce good fruit in our climate.

A. J. N., Kansas City, Missouri.

A. I am glad to send you the best advice and suggestions I can as to planting for the improvement of your place. The best varieties of apples for your use would be Red Astrachan, McIntosh, Baldwin or Rhode Island Greening. The best pears are Bartlett and Sheldon. The best peaches would be Champion and Elbert, and the best varieties of cherry, Early Richmond and Montmorency.

For shrubbery, I would suggest forsythia, weigela, California privet, *Aralia pentaphylla*, *Cornus siberica*, *Rosa rugosa*, Rose of Sharon, lilacs, hydrangea, Regel's privet, *Symphoricarpos racemosus* and *Symphoricarpos vulgaris*. In the January issue of AMERICAN FORESTRY you will find an article on hedge planting and cultivation.

Q. Can you tell me what is the matter with the tree of which I send you a specimen leaf, under separate cover?

E. H. K., Philadelphia, Pennsylvania.

A. The leaf of aspidistra received proves to be severely infested with the Florida red scale (*Chrysomphalus ficus* Ashm.). Remedies recommended for use against this insect are described in the enclosed circular.

Q. Will you please explain the difference in the Red Gum and the Sweet Gum?

R. J. M., Chelyan, West Virginia.

A. There is no difference between the Red Gum and the Sweet Gum. They are one and the same tree, also called *Liquid-*

ambar, meaning liquid gum, referring to the sweetish, fluid, gummy exudations. The Black, or Sour Gum, sometimes called Tupelo, is an entirely different tree. I enclose an article from the November issue of our monthly magazine, AMERICAN FORESTRY, covering fully the identification and characteristics and commercial uses of Red Gum. I think you will find this interesting and valuable.

Q. Will you please tell me what to do for a tulip tree that has some kind of a scale. They come on the branches and on the new wood. They are dark brown, shaped like an oyster. When you crush the shell, they are pink and like thick milk and honey. In the spring the young ones are white and look like a bed-bug and can crawl.

H. R. T., Sands Point, New York.

A. The scale is the tulip scale and very commonly infests tulip trees in your vicinity. The best way to eradicate the pest is to brush off the scale insects with a coarse hair brush and then wash the infested branches with a solution of soap and water or kerosene emulsion, one part to ten parts of water. Before brushing the scales off, it is advisable to spread some canvas or paper on the ground in order to collect the insects and burn them afterwards. This work should be done immediately and the trees watched again next summer for a second crop of the insects. Within about a year, the pest can be permanently eradicated.

Q. Is *Thuja plicata* the correct name of Western Red Cedar? And will you give me the common and technical names of the Southern pines?

R. C. F., Flushing, New York.

A. Yes, *Thuja plicata* is the correct technical name for Western Red Cedar. The correct common and technical names of the Southern pines are as follows: *Pinus palustris*, known as Long-leaf Pine, or Georgia pine; *Pinus echinata*, or Short-leaf Pine, Yellow pine; *Pinus Taeda*, the classical Latin name for pitch pine, which was used for torches; *Pinus caribaea*, or slash or Cuban Pine.

Q. I wish to obtain your opinion relative to the practice, now so common, of scraping the outer bark from our shade trees for the purpose of removing scale and other insects, and furnishing no places for their concealment. Many of our most beautiful shade trees, generally elms, have been given this treatment and occasionally the trunk is afterwards painted with some insecticide. All this operation entails great expense to the tree owner. Personally I have been opposed to this treatment of trees, but I would appreciate a discussion from you on the subject.

W. W. M., Chicago, Illinois.

A. There is no justification for the practice of scraping the bark of shade trees. It does no good and sometimes does harm and many varieties of shade trees, such as Norway maples, Oriental planes, etc., very seldom have any scale insects on their trunks. If you spray the infested trees with oil solution at the proper time, especially when the young scale insects hatch and become active, you will generally catch most of the insects, no matter where they are—under the loose bark or on top of it. Scraping off the old bark exposes very suddenly the young, tender bark underneath to sun, heat and dust and smoke, and produces better bait for scale insects than the old bark because scale insects prefer to live on young, tender bark. We think that if you would allow nature to take care of the loose, superfluous bark and not scrape it off prematurely, the trees would be better off.

AEOLIAN EROSION IN HAWAII

BY C. S. JUDD

SUPERINTENDENT OF FORESTRY

AN unusually good instance of æolian erosion is to be seen on the island of Kahoolawe in the Hawaiian group, which I have recently visited. It is a striking illustration of damage done by goats and sheep and wind.

This island, which is one of the smallest of the group, and only ten miles long, six miles wide, and 1425 feet above the sea at its highest point, was proclaimed a Territorial Forest Reserve in 1910 with the idea that it could be reclaimed from its present deplorable condition, which has resulted from over-grazing during the past fifty years. Kahoolawe was always a more or less barren island, for in the early days its inhospitable shores were used as a place of exile for criminals and historical records show that at no time were there more than eighty Hawaiians living there.

In 1864 the island was leased by the King for fifty years as a sheep ranch. Wild goats, descendants of those brought by Vancouver and other early navigators, were already on the island, and these with the sheep, which soon multiplied and overran the island by the thousands, upset the balance of nature on the upper reaches which were exposed to the full force of the constant trade winds. The consequence was that the remaining turf on about one-third of the island at the upper elevations was destroyed, and the loose soil exposed in this manner soon began to be carried out to sea by the wind. This

æolian erosion has been going on for at least forty years, and ship captains always know of their approach to Kahoolawe on windy days by the cloud of light red dust that pours off in the lee of the island. In a few protected places on the summit, islets of soil from six to ten feet high, crowned with turf, remain as mute testimony of pristine conditions, but the soil on the remainder of the summit of the

island has been blown away until nothing remains but bare hardpan, as bleak and as desolate as the bad lands of the Dakotas, and still scoured by the howling trade winds.

One of the accompanying illustrations shows how a native wili wili tree, *Erythrina monosperma*, has been undermined by wind erosion and left stranded, as it were, on this shore of desolation with only a few roots to carry on the functions of life. In the lee of the tree there still remains a mass of original protected soil which has been augmented by dust drift.

Although the reclamation of the summit of the island seems hopeless, unless stone-wall barriers to the wind are erected at great expense preliminary to tree planting, the remaining two-thirds of the island gives greater promise of early improvement. The first step in the plan of reclamation has been to get rid of the wild stock on the island, and during the last eight years over 4,000 goats have been exterminated. I have returned from the island with a party of fifteen members



WHAT THE WIND HAS DONE

Wili wili tree on Kahoolawe Island, Hawaii, undermined by the strong trade winds blowing the soil around it out to sea, after sheep and goats had cropped the turf so closely that the wind tore it off and exposed the underlying soil.



AN AERIAL BATTLEFIELD

On the summit of Kahoolawe Island, Hawaii, lie trunks of dead trees killed when the strong trade winds swept away the soil about their roots after the soil had been exposed by over-grazing by sheep and goats.

of the National Guard of Hawaii and two cowboys, and during the short stay of two days our bag was 286 goats and 2 sheep. The island has already begun to show improvement on account of the reduction of stock, by the increased growth of native grasses and weeds, and the algaroba, *Prosopis juliflora*, or mesquite of the Southwest, which has been spread by the few work horses which have been allowed to graze on the island, is coming up abundantly on at least 18,000 acres along the lower elevations and promises soon to become an extensive forest valuable for the production of wood for fuel, beans for stock feed, and blossoms for bee pasturage.

TOUR OF THE NATIONAL FORESTS AND PARKS

A COMBINATION of recreational and educational features is the plan for a tour of the National Forests and National Parks proposed by the Massachusetts Forestry Association for the coming summer. The Association proposes to give its members and others who were interested in conservation and the development of the National Forests and Parks an opportunity of seeing at first hand, under the most favorable circumstances, what has been done with these great areas and to learn what the plans for the future are concerning them.

The Association is deeply indebted to the officers of the United States Forest Service and those of the National Parks Service for their coöperation in the preparation of the plans for this tour. Through their advice and kindly assistance, those who are fortunate enough to make this tour will have at their service in many of the parks and forests the men who are most familiar with those areas and who are charged with the development of them.

On Thursday, June 28, the party will leave Boston, arriving in Denver the following Sunday morning, there to visit Rocky Mountain Park, Pike's Peak, and to inspect the reforestation work of the Forest Service in the Pike National Forest.

Six days will be spent in Yellowstone Park and six more in Glacier National Park. From the Glacier National Park the party will journey to Lake Chelan in the Chelan National Forest, there to be guided by a representative of the United States Forest Service.

The party will have two days for rest at Seattle and an afternoon sail through Puget Sound to Tacoma will be made on the way to Rainier National Park and Forest and then on to Portland. From there the party will take an all-day journey over the beautiful Columbia highway to the Eagle Creek Camp which is one of the best examples of the recreational facilities furnished by the National Forest Service. The next day another auto ride takes the party among the foothills of Mount Hood to the Forest Nursery of the Wind River Valley where over 5,000,000 young trees are growing. On this trip will be seen the scientific logging methods used on a timber sale area of the National Forest. Crater Lake National Park and Forest will be the next destination.

After the trip to Crater Lake three days will be spent in San Francisco in rest and sight-seeing. A conference on the various aspects of the conservation problem will be held with the representative interests of the Pacific Coast. From San Francisco the party goes to the Yosemite National Park where five days will be spent in the camps, and in seeing the beauties of this famous valley. Leaving the park, the party passes through the Sierra National Forest on the way to Fresno. The next point of interest will be the General Grant National Park where the Big Trees will be seen at their best. A visit to Hume, a lumber town in the heart of the Sequoia National Forest, will give a new idea of transportation of timber, by a fifty-four-mile flume winding down the mountain. Los Angeles for three days with short excursions to Pasadena and the island of Santa Catalina follows. An optional visit may be made to the Los Angeles Municipal Camp in the Angeles National Forest, where public recreational facilities have been highly developed. San Diego and its exposition will next be visited, followed by a motor trip to Redlands and San Bernardino where will begin the homeward journey, interrupted only by a two-days' stop at the Grand Canyon.

Arrangements are being made by boards of trade and similar organizations in the Coast cities to give the party a hearty welcome. A nominal guest fee will be charged to non-members of the Massachusetts Forestry Association, but this will not apply to applicants who are members of other forestry or conservation organizations. Further details of the tour can be obtained by writing to the Tour Director, Dr. C. L. Babcock, 31 Trinity Place, Boston, Massachusetts.

LAKE SUNAPEE

By Richard Butler Glaenzer

Oh, do you know that lovely lake not far from Croydon
So like some girlish dreamer when asleep;
When wide-awake, so like some hoyden?
That lake which seems so shallow, yet is deep, so deep?

There are a thousand lakes more large, oh, far more spacious,
Basined among great mountains capped with snow;
But none with marge more brightly gracious,
And largeness counts for little: here is glow and glow!

The glow, the gentle silver gleam of far more birches
Then ever Indian wanted for canoe:
A waking dream for one who searches
For gleam of haunting silver—such as you and you!

THE Grand Rapids, Michigan, Y. M. C. A. is starting an innovation in the organization of an educational class for members of the many lumber and forest products factories of the city. Such problems as methods of cutting, sawing, piling and air-drying are to be considered.

PINE BLISTER QUARANTINE HEARING

A PUBLIC hearing to consider the restriction or prohibition of shipments of pines and of currant and gooseberry bushes, to prevent the spread of white pine blister disease, was held by the United States Department of Agriculture on April 10, at Washington, D. C.

The question of whether a quarantine line should be drawn either at the western border of the States of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas, or at the Mississippi River, or at some intermediate point, was considered.

The white pine blister disease has continued to spread in New England and eastern New York and has been found to a limited extent in Minnesota and Wisconsin. Energetic measures for its eradication or control are being taken by Federal and State Governments and by the American Forestry Association in realization of the danger which threatens our immensely valuable pine forests. To assist in this control work and to prevent the blister disease from getting a foothold in the western United States, consideration was given to the desirability of prohibiting all shipments of white pine nursery stock from the Eastern and Central States to the Western States. Currant and gooseberry nursery stock must also be considered in this connection, since they are hosts for the blister disease, and are a necessary stage to its development.

A domestic quarantine to protect the pine forests of the West was proposed a year ago and a hearing held in February, 1916, by the Federal Horticultural Board. It was then found that the most effective results would be secured by prohibiting the shipment of Eastern pines and gooseberry and currant bushes west of a line drawn beyond

the Mississippi. Such a quarantine was not then legally possible nor was sufficient knowledge available of the distribution of the disease in the Central States; consequently, Federal action was limited to securing the voluntary coöperation of nurserymen to prevent shipments west of the Great Plains.

Congress at the last session amended the Plant Quarantine Act to permit the drawing of quarantine lines where needed to prevent the spread of plant pests rather than at the boundaries of infected States.

WHAT VARIOUS STATES ARE DOING

That the introduction of the white pine blister disease into California may be prevented, and to coöperate with the Eastern States in its suppression, G. H. Hecke, State Commissioner of Horticulture, has issued a quarantine against the introduction into California of all five-needled pine trees, and all species and varieties of currant and gooseberry plants and cuttings imported or brought from any and all States of the United States east of the Mississippi River. The disease has not yet been noticed in California, and it is believed that this quarantine will prevent its introduction.

Indiana and Kansas prohibit the importation into the State from outside sources of all species of currants and gooseberries and of all five-leafed pines.

New York, March 24, 1917, prohibited the importation into the State of any five-leafed pines from Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Pennsylvania, Illinois, New York, Ohio, Indiana, Minnesota, and Wisconsin.

National Forest Enlarged

Acting under the authority of a special Act of Congress approved September 8, 1916, the President has, on recommendation of the Secretary of Agriculture, signed a proclamation adding approximately 50,000 acres to the Whitman National Forest, Oregon. The lands involved are situated on the divide between the John Day, Powder, and Burnt Rivers, in east-central Oregon.

Over 4,000 acres consist of timber lands which were included in patented entries. As the result of suits brought by the United States, the patents for these entries were cancelled by the courts because they were acquired through fraud or mistake, and the lands were returned to Government ownership. The cancelled claims carry a total estimated stand of nearly 46,000,000 feet B. M. of timber.

Much of the other land included in the addition is privately owned. It consists largely of out-over timberland, on which the timber growth is rapidly reproducing.

One portion of the Act of Congress authorizing the addition provides especially for the exchange of Government timber for privately owned lands in the Whitman National Forest which may be chiefly valuable for the production of timber or the protection of streamflow. Several applications for exchanges of this character have already been submitted.

Saw Expert Addresses Forestry Students

Thomas Oakland, one of the saw experts representing the Simonds Saw Company of Fitchburg, Massachusetts, lectured to the forestry students at Wyman's School of the Woods, Munising, Michigan, March 7th, on the use and care of the cross-cut saw. He explained how saws were made, how to select them when buying, and how to keep them in good working order when in use. Mr. Oakland is an old woodsman and a past master with the cross-cut saw. His actually fitting and filing a saw before

the students made it especially practical and instructive.

Forester Appointed

Trevor S. Goodyear, a student in the department of forestry of Washington State College, has received notice of his appointment as assistant state forester of Washington. He has accepted the position and expects to assume his duties about June 1. Mr. Goodyear graduated from the State College last June, but returned to take another year in forestry. During the vacation he was employed by the Washington Forest Fire Association with headquarters at Seattle, and there came under the observation of State Forester Pape, who was so favorably impressed with his qualifications that he recommended the appointment to the state board of forest commissioners, who confirmed the recommendation. Mr. Goodyear was a member of the varsity football squad for three years, and was president of the State College Forest Club last year. He is also commander of the Sigma Nu fraternity chapter.

EDITORIAL

THE SUMMER CAMPAIGN AGAINST THE WHITE PINE BLISTER

AS a direct result of the policy of education and information adopted by the American Forestry Association and others, Congress passed the additional appropriation of \$300,000 required for the work of suppressing the white pine blister disease. This action was taken at a time when bills calling for immense appropriations for national defense were under consideration, and the appropriation was secured in spite of assurances from Congressmen that it would be impossible to obtain it. The result is a vindication of the policy of publicity, without which, in a democratic form of government, we cannot hope to achieve anything worth while.

But the real task lies before us. Appropriations alone will not exterminate the disease—and it is by no means certain that the effort will succeed, no matter how conscientiously the work is handled. One thing has been pitilessly demonstrated—that the policy of suppressing information and belittling the danger has not gotten us anywhere. By this act of Congress we now stand com-

mitted to a thorough and widespread effort to stamp out the infection. This season will probably show whether or not it is too late. All that the agents of the United States Government can do in expending this appropriation is to scout for and reveal the presence of diseased pines or currants. It is up to the states and to individuals to destroy the infected trees and plants, and if this coöperation is not forthcoming, all efforts elsewhere will fail.

The work of preventing the spread of the disease will be greatly aided by the enlarged powers granted to the Federal Horticultural Board to declare quarantines in tree and plant diseases by districts, states or sections of the country under which they may prevent absolutely the shipment of currants or gooseberry bushes or white pines into the Rocky Mountain section. So far, no cases of infection have been reported west of Minnesota. Such a quarantine may save the immensely valuable western white pine and the sugar pine of California from ultimate destruction.

NATIONAL PARK LEGISLATION

THE bill to create the Grand Canyon National Park failed of passage in the last Congress for lack of time. This bill, as drawn, excludes from the proposed park lands chiefly valuable for commercial grazing and timber, and not part of the Canyon itself. It should be reintroduced and passed at the first opportunity. But we protest against permitting the development of water-power within the Park, and will continue to strive for the principle of exclusion from National Park areas of all forms of commercial exploitation—a danger which is not properly safeguarded in the recent law establishing a National Park Service.

Of the numerous bills introduced in this Congress to create new National Parks, only one was passed, which establishes the Mount McKinley National Park in Alaska. In this matter, Congress has acted with commendable discretion. The merits of the Mount McKinley Park project were unquestioned. As America's highest peak, possessing scenery of unsurpassed grandeur, the setting aside of this mountain as one of our National Parks fully maintains the standard set by the Yosemite, the Yellowstone and the Sequoia. This cannot be said of any of the other park projects, which have met at least temporary defeat. It is to be hoped that most of them will not be revived.

PRIMARY EDUCATION IN FORESTRY

IT has been thought by some that the development of forestry on a large scale in Germany is due to the fact that an autocratic form of government enables the rulers to impose upon the unresisting masses public measures of common benefit, while in a democratic country the instability of government and the influence of individual opinion will prevent the consistent development of any great constructive forestry policy.

What, then, shall we say of forestry in republican France, where both science and practice have been developed to fully as great an efficiency and with equal benefits to the people?

That stability of policy in forestry is necessary goes without saying. Trees cannot be grown unless the land on which they are produced is protected and managed for long periods under intelligent supervision for that definite purpose. Otherwise the forest will be destroyed by unregulated lumbering, fires, insects, disease, and grazing, or by the clearing of much land for indifferent and unprofitable agriculture that had better be devoted to forest production.

What we do not yet realize fully is that forestry in Imperial Germany rests on the same basis as it does in republican France, and on which it must eventually depend in this country—a *thorough education of children in the grade schools in the first principles of forestry*, and its true place in the economic life of the nation.

As the twig is bent, the tree is inclined. If the right conception of forestry is implanted in the mind of the child, his attitude towards it for the rest of his life will be equally free from that destructive bent which makes vandals of half-grown boys, and the equally unreasoning sentimental attitude of protection expressed in the poem "Woodman, spare that tree," which would deny the value and use of wood products to the community.

Some of the greatest difficulties that the advocates of rational State and National forest policies encounter are created by the attitude and opinions of influential men who are profoundly ignorant of forest economics, and in a spirit of cocksure self-assertion sometimes appear as

champions of legislation whose tendency is to cripple or destroy efficient and sound forest administration. As an illustration, during the consideration of a dangerous bill in the Philippine legislature recently, whose purpose was to combine the forestry department with that of lands and mines, an American of some prominence remarked, "What has the forestry department of the Islands ever accomplished—they haven't even pruned the trees!" Again, many of our best citizens can see but one, and that by no means the most important, aspect of forest production, namely, the æsthetic value of forests as parks. This type of enthusiast has effectually paralyzed the proper development of the state forests of New York, and if permitted full sway would render the economic use of every acre of National Forest land impossible. The intentions of these citizens are of the best, but they have utterly failed to understand the basic facts of forestry, which recognize *all* the uses of the forest in both æsthetic and industrial life. The remedy for this condition lies in a *better system of primary education on the value and uses of forests in the life of the nation.*

But what can we expect to teach a grade school pupil about forestry? An answer is found in the following statement by a young German of high school age, who has been a resident of this country since he was ten years old, but has never received any instruction in the subject except that which is given to all grade pupils in the schools of his native land.

"In the *third grade* I was taught the meaning of care for a tree and a forest. We were given a course in the growth and development of trees and forests. We learned that a tree is of great value to the country. It affords shade, consumes carbon dioxide *and yields lumber.* The abundance of trees means that the adjacent land will be fertile. I remember I was told that the massive foliage of the trees softened the downpour of torrential rains. The same foliage when dropped by the trees in the fall served as a fertilizer. Leaves, being a poor conductor of heat, preserve the moisture in the ground. *Forests increase the agricultural products of agricultural communities. Forests also have tremendous financial value in the lumber a forest will yield.* I was also shown the beauty of trees as well as their value in other respects."

When every citizen of a nation has such fundamental and *well balanced* conceptions of forestry—and when even an eight-year-old boy knows that the beauty of trees is only one feature, "as well as their value in other respects," is it any wonder that rational forest management, by which the forests are both *utilized*, and *renewed*, has taken the place of our primitive policies, which seek either to utterly destroy them or to preserve them intact?

Let us use every effort to introduce a short but effective course in forestry into every public school in the land. In this way only will the forest policies of our great country be built upon the rock foundation of popular intelligence and approval.

THE PUBLIC DOMAIN AND THE STOCK-RAISING HOMESTEAD LAW

IN AMERICAN FORESTRY, October, 1916, page 619, a statement was given based on most recent investigations showing the extent of the public lands in western states, reserved and unreserved. Outside of the National Forests these lands are largely non-timbered, and non-irrigable, and can be used only for grazing.

For years the question of the proper policy for their management was debated in Congress. The struggle lay between the advocates of a leasing law permitting the Interior Department to administer grazing and to collect fees and the plan proposed of facilitating the private acquisition of these lands. By the latter method the lands would be placed on the tax list and would produce local or state revenues, either by taxes or later by confiscation for unpaid taxes, when the states could lease the lands and get the grazing revenue. Incidentally, such a law would greatly increase the business and the fees of the officials of the United States Land Office.

With the three great forces behind it, the desire of the individual for land, the desire of the state for revenue and the desire of the land office for business, nothing could stop the passage of the stock grazing law.

The law was safeguarded by stipulating that only non-forested and non-irrigable land could be filed upon and then only after the Interior Department had examined and designated it as land suitable only for the purpose of the law, namely, for stock grazing. Mineral rights were reserved to the Government. The area allowed to each individual is 640 acres.

But here comes the rub. Land which cannot be irrigated, lying in arid regions and not capable of dry farming, in other words, land of the character contemplated by this bill, will graze only one cow on from ten to forty acres, depending upon the local conditions. The average capacity is perhaps twenty acres, giving a herd of 32 range cattle as the possibility from which to make a living. To obtain title to this land, improvements worth \$1.25 per acre are required.

It is the judgment of stock raisers that fully 100 head of cattle are required to yield a competent living and this requires from four to ten sections of grazing land. If these facts are true, *the stock grazing law is based on a fundamental economic error* and only about one man in from four to ten of those who file on these homesteads and invest their time, health and capital in improvements can hope to win out, and then only by acquiring title to the lands of those who fail. But as these failures may not all prove up before quitting, an extended period of economic disturbance and adjustment will be inevitable, during which the present winter range for stock will be split up, fenced off and made inaccessible, to the disruption of the stock business as now conducted. Unless economic questions affecting the public welfare are settled on some other basis than immediate self-interest, the public inevitably pays the piper in the long run. In this instance, private interest has won. Let us hope that similar questions which may arise in the future will be looked at from a broader and more far-reaching standpoint.

BUILDING BUNGALOWS

BY RAWSON WOODMAN HADDON

WHEN all other methods of arrangement for the interior of the house have failed, one may turn, with fair expectation of success, to the one-story type of building which we have come to know—quite improperly—by the name of “bungalow.”

smaller cost in a two-story house, or a larger number of rooms might have been had in a two-story house for the same amount.

These items, of course, are naturally to be taken into consideration in estimating the comparative costs of a one- or two-story house, before deciding upon the type of plan to be used.

It is probable that we are in the habit of considering the “bungalow” type inexpensive because of the fact that in many instances, where the cost of erection has been low, the building itself was little more than a camp. In it the owners were, perhaps, satisfied with the barest accommodations and cheap workmanship and material of a kind that would not be tolerated if a larger or more permanent structure were used.

Even with the rooms of the house spread out on a single floor, the plan may be a failure notwithstanding many good points in favor of the general type. It may be its very simplicity, or what we take for simplicity, that so often lures us into a false sense of security and into a certain amount of carelessness and thoughtlessness in planning at the very points where the greatest care has been exercised in

the successful examples of the type that the prospective builder may have seen and admired.

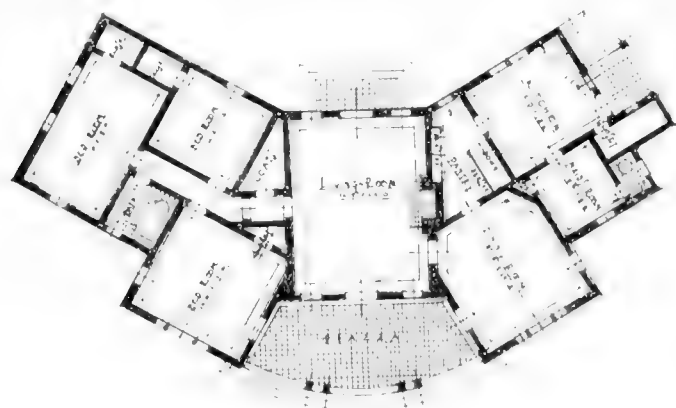
But the very fact of its simplicity in plan and in exterior design brings new problems and new chances for



FRONT ELEVATION OF HOUSE AT SOUTH RIVER, MARYLAND. AYMAR EMBURY II, ARCHITECT

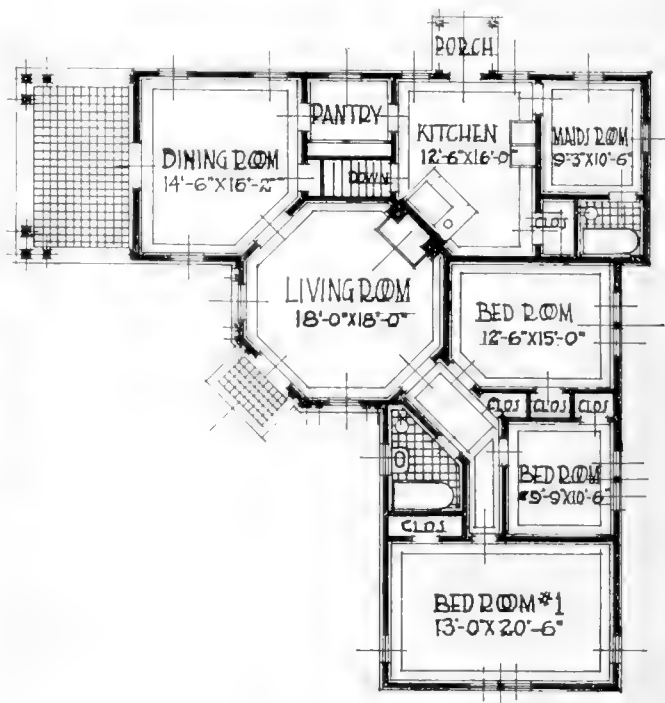
A very general idea seems to be that this one-story house arrangement is so simple a problem that it need be by no means as carefully thought out and studied as a more formal type of residence; and a second unfortunate idea is that it is a cheap method of building. Both are serious mistakes.

In the first place, it is well to remember that in the “bungalow” there is more outer wall surface to be covered, and more roof area in proportion to the enclosed part of the building than in a house of two, let us say, or more stories in height. And it is probable that in the majority of cases the same accommodations in the number and size of rooms could have been secured at a somewhat



PLAN OF HOUSE NO. 1

At Southern Pines, North Carolina. Aymar Embury II, Architect.



PLAN OF HOUSE NO. 2

At Southern Pines, North Carolina. Aymar Embury II, Architect.



ELEVATION OF HOUSE NO. 1

At Southern Pines, North Carolina. Aymar Embury II, Architect.



ELEVATION OF HOUSE NO. 2

At Southern Pines, North Carolina. Aymar Embury II, Architect.

failure or success. At the same time, the advantages of the type are many.

There is the total absence of stairs, for instance, and an opportunity, in laying out the plan, of arranging the rooms in such a manner that important rooms may have two, if not three, walls with windows in them, assuring a constant cross-circulation of air. The most popular arrangement of rooms is that in which the living-room occupies a central unit of the plan, with wings or extensions at either side, in one of which is the service portion of the house, with the dining-room closely connected with it and adjoining the living-room.

On the other side of the central room in this plan are the sleeping-rooms, sleeping-porches, bath-rooms, etc. The natural advantages of this arrangement are obvious.

Being built usually on more or less isolated tracts of land, where the surroundings are more often trees, or at least broad expanses of lawn or field, the long, low lines of the house "fit" far more naturally and pleasingly into the landscape than the bulk of a higher and smaller building in ground area would.

Greater opportunities are given the designer by these conditions for interesting composition in his design. And—

always—the long, low, unbroken roof lines give the house a feeling of homelikeness that is seldom secured in buildings of greater height.

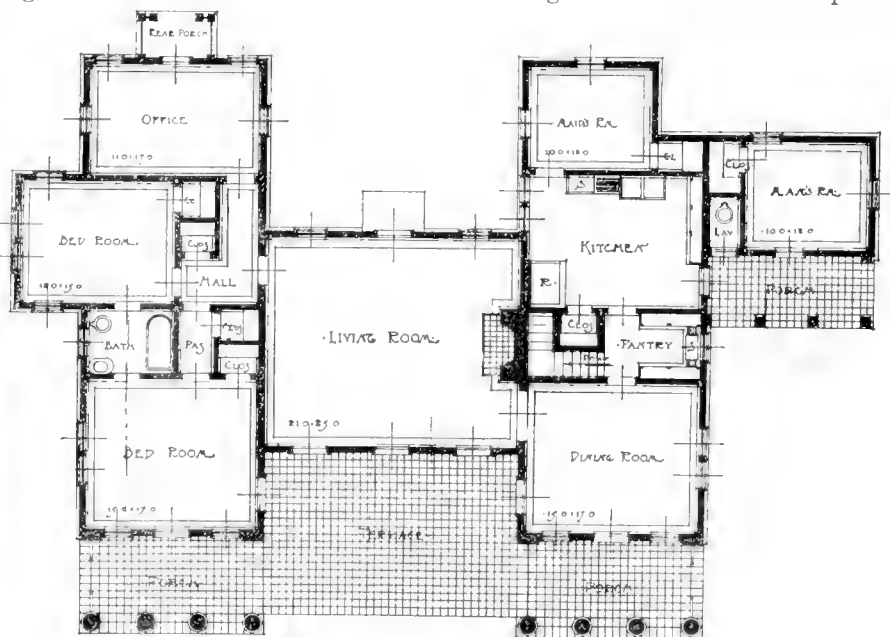
Here, again, we come face to face with a certain amount of wastefulness in the one-story arrangement of rooms. Taking into consideration the previously mentioned large expanse of roof necessary to cover the floor space below, we find ourselves with a large amount of room under the roof that, while it helps the general appearance of the house, is, however, not easily made use of, excepting possibly for storage or similar purposes.

The insertion of dormer windows here will immediately spoil the most interesting feature of the exterior design. If we raise the roof high enough to get room height and window space in the side walls below the roof, the character of the building is automatically and immediately changed, and we no longer have a one-, but a two-story house. Bed-rooms on the ground floor are now quite



REAR ELEVATION OF THE HOUSE AT SOUTH RIVER

Showing the office entrance and the court formed by the kitchen and bedroom wings.



FIRST FLOOR PLAN

PLAN OF THE HOUSE AT SOUTH RIVER, MARYLAND

Illustrating the most successful arrangement of the one-story house. Aymar Embury II, Architect.

BUILDING BUNGALOWS

(Continued.)

unnecessary and we find ourselves with a conventional and—if the exterior design follows "bungalow" character and lines—a thoroughly unsuccessful and ugly house.

The buildings designed by Mr. Embury, and illustrated here, are successful examples of one-story houses erected in various parts of the country and arranged to meet the requirements of occupancy and location brought about by conditions of site and location, and by the widely differing personal needs of the families occupying them.

The object of the unusual arrangement in plan of the two Boyd bungalows at Southern Pines, North Carolina, for instance, was to get certain conditions of view and sunshine in the principal rooms, with the possible entrances from the street from what was practically the rear. These houses, which cost about six thousand dollars each, were built throughout of North Carolina pine. The clapboards were laid four and one-half inches to the weather and the shingles four inches. The framing timbers, interior and exterior door and window trim, the doors, floors, etc., are all North Carolina pine.

In addition to considerations of design, Mr. Embury used the material chosen because it was also the cheapest. "North Carolina pine down there," he says, "was then about seventeen dollars a thousand, while everything else was much higher."

The St. George Barber house at South River, Maryland, illustrates the central living-room type which has been mentioned as the most successful "bungalow" plan. The living-room is in the center of the building, with wings at either side in close connection with the central room and at the same time entirely separated from each other.

The dining- and bed-rooms all have exposures on three sides. The hall cuts off—by the simple closing of a door—the bedroom wing from the entire remainder of the house. The bath-room is especially well placed in its relation to the bed-rooms adjoining it.

If the room at the end of the wing, now used as an office, was used as a bed-room, some slight rearrangement of the bath-room fixtures would make it possible to enter the bath from the hall. A separate porch for servants is provided with an entrance to the kitchen.

This house was built for about eight thousand dollars. The shingles were laid in random widths, and the finish is much the same as in the Boyd houses.

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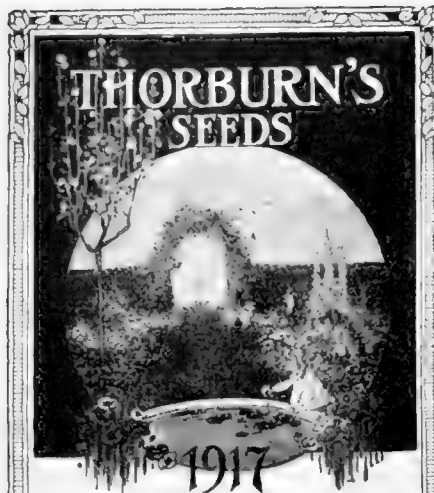
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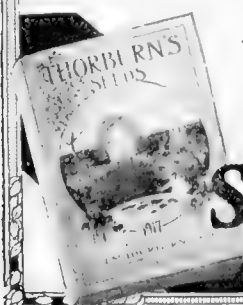
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Weiss Takes New Position

Howard F. Weiss, Director of the Forest Products Laboratory, at Madison, Wisconsin, has resigned to accept a position with the C. F. Burgess Laboratories (Chemical Engineers), at Madison, and will engage in the development of products and processes involving a more profitable utilization of wood and timber. As director of the largest government laboratory in the world devoted to the study of wood, Mr. Weiss has had charge of numerous investigations in kiln drying, wood preservation, wood distillation, the manufacture of pulp and paper, the mechanical testing of timber, and the production of ethyl alcohol, turpentine, etc., which work has thrown him in direct contact with timber problems in the United States, Canada, Cuba and South America. Several of the government publications are written by him, and his book, "The Preservation of Structural Timber," is the most exhaustive written on this subject.

Thrushes Destroy Insects

A study of six species of thrushes by the Biological Survey shows that the economic tendencies of these birds are in keeping with their other desirable qualities. They commit no depredations on crops, and destroy large numbers of insects.

CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY, CANADIAN SOCIETY OF FOREST ENGINEERS

Forest Protection for the woodlands of Quebec is making most satisfactory progress. All of the timberland owners in the valley of the upper Ottawa River have decided to join the Lower Ottawa Forest Protective Association. This will bring the territory patrolled by this association up to nearly fifty thousand square miles. The territory will be divided up into districts, each under the control of an inspector.

On March sixth, at the Chateau Frontenac, in Quebec, a meeting of the timberland owners on the south shore of the St. Lawrence River, from a point south of the City of Quebec to the end of the Gaspé Peninsula, was held under the chairmanship of Ellwood Wilson, President of the St. Maurice Forest Protective Association. The question of forming a new protective association for this region was thoroughly discussed, and it was decided to organize. A committee was appointed to draw up a constitution and by-laws. Later in the day this committee reported, and after a deputation had waited on the Minister of Lands and Forests to ascertain his position and what the Government would do to help the

new association, it was formally organized. Mr. Gerald Power, of the River Ouelle Pulp Company, was elected President, and Mr. Paul G. Owen, who has been for many years Secretary of the Quebec Limit Holders' Association, was made Secretary-Treasurer. The territory of this Association, which is to be called the Southern St. Lawrence Forest Protective Association, will comprise about twenty thousand square miles and will be divided into two sections, each with a board of five directors, with a vice-president and general manager. The Province of Quebec is now fairly well covered with protective associations, the only important section left out being the Lake St. John Region, and it is hoped that the limit holders in that section will soon follow the lead of the rest of the Province.

Another Forestry Battalion for use in England and France is being recruited in the Province of Quebec by Major H. J. Lyons, of the Canada and Gulf Terminal Railway. His acting chief engineer, Mr. E. S. Holloway, has enlisted as lieutenant. Major Lyons had already enlisted a railway construction battalion which is doing good service in France. These construction battalions are employed in France to keep the lines of communication following close up to the first line so that big guns, ammunition, men and supplies may be moved up rapidly.

Dr. Howe, of the University of Toronto, with two technical assistants, will commence for the Commission of Conservation and in cooperation with the Laurentide Company, Limited, a survey of the cut-over pulpwood lands. This survey will determine the amount of wood left after logging, the reproduction, rate of growth and probable yield of timber after a certain number of years, and will make recommendations as to improved methods of cutting.

The Belgo-Canadian Pulp and Paper Company, Limited, of Shawenegan Falls, Quebec, has decided to commence planting trees on its holdings, making the third large paper company to undertake such reforestation work.

The Canadian Forestry Association has just issued a very instructive and attractive little book, "Mon Premier Livre sur la Forêt," for distribution to school children throughout the Province of Quebec. It is most attractively gotten up, is about four and one-half by six inches, and is full of illustrations, showing well and badly managed forests, those undamaged and those damaged by fire, the destruction wrought by bombardments of forest areas in France, lumbering scenes, fire ranging work, erosion and so forth. The text is also exceedingly interesting and the whole book will be of great help in educating the young people about their most important natural resource and its proper care. The

association has also issued a small folder in both French and English, called the "Picture of Your Enemy," which, on being opened, shows an excellent colored picture of a forest fire and warns everyone to be careful.

Here, as elsewhere, it is being more and more fully realized that the greatest measure of protection for our forests comes through education. This has been so strikingly shown in the work of the St. Maurice Protective Association that further efforts are continually being made to educate and interest the people in this work and to secure the active coöperation of all who live in or near forested sections.

The new Forest Protective Department of the Province of Ontario is getting well into harness, and has made elaborate plans for good protection during the coming danger season. A fire tax will be imposed on timberland holders and everything possible will be done to give them first-class protection.

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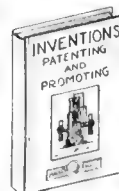
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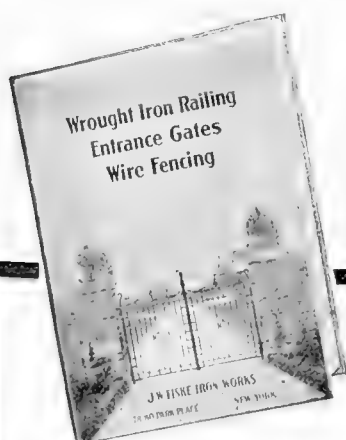
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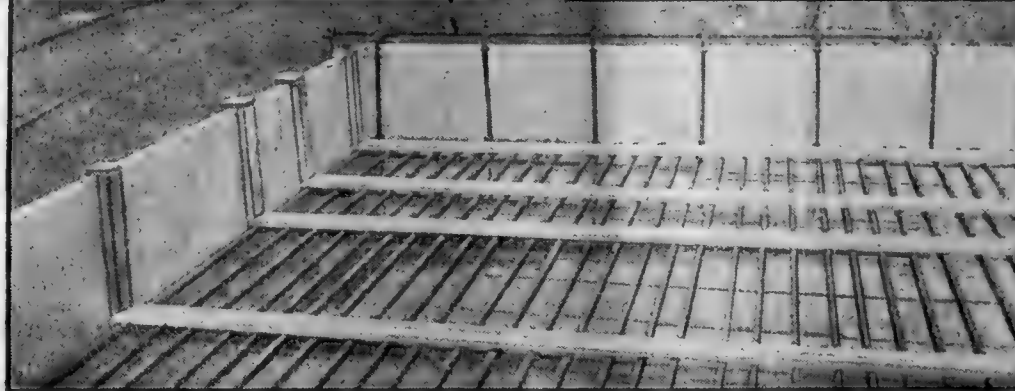
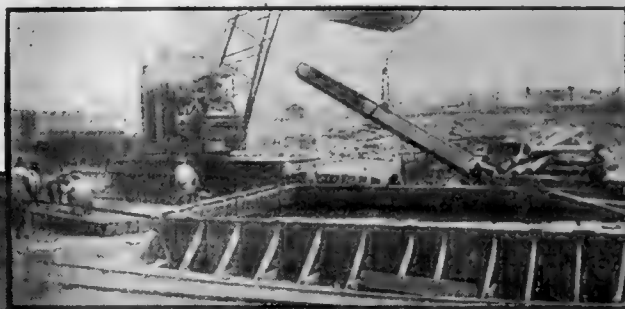
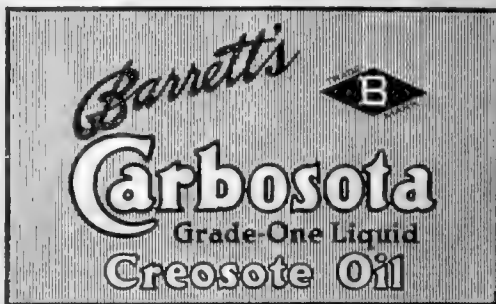
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American Forestry



An Illustrated Magazine about Forestry and
Kindred Subjects Published Each Month
by the American Forestry Association
Washington, D.C.

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal cooperation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by cooperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

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Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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MAY 1917 VOL. 23

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1,560,000	White Oak
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680,000	Sycamore
670,000	Maple
560,000	Elm
460,000	Cottonwood
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REAL ESTATE

**SALE OF TIMBER FLATHEAD INDIAN
RESERVATION**

SEALED BIDS MARKED OUTSIDE "BID" Flathead Timber, Ronan Unit" and addressed to Superintendent of the Flathead Indian School, Dixon, Montana, will be received until twelve o'clock noon, Mountain time, Tuesday, September 11, 1917, for the purchase of the merchantable timber upon tribal and allotted lands situated within Sections 4 and 5 T. 19 N., R. 19 W.; Sections 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 32, 33, and 34 T. 20 N., R. 19 W.; Section 21, 22, 27, 32, 33, and 34, T. 21 N., R. 19 W.; Section 1 and Section 12 T. 20 N., R. 20 W. M. P. M. containing approximately 57,000,000 feet of timber, over 80 per cent Western Yellow Pine. Each bid shall state the amount per thousand feet B. M. offered for Yellow Pine (including "bull pine") and the amount per thousand feet offered for Fir, Larch and other species. Each bid must be submitted in triplicate and be accompanied by a certified check on a solvent national bank, drawn in favor of the Superintendent of the Flathead Indian School, in the amount of \$2500. The deposit will be returned if the bid is rejected, and retained as a forfeit if the bid is accepted and the bond and agreements required by the regulations are not furnished within 60 days from the date when the bid is accepted. No bid of less than \$3 per thousand feet for Yellow Pine and \$1.25 per thousand feet for Douglas Fir, Larch and other species will be accepted. The right to reject any and all bids is reserved. Copies of regulations and other information regarding the proposed sale including specific description of the sale area may be obtained from the Superintendent of the Flathead Indian School, Dixon, Montana.

Washington, D. C., May 4, 1917. CATO SELLS, Commissioner of Indian Affairs.

**TIMBER SALES, KLAMATH RESERVATION,
OREGON**

SEALED BIDS WILL BE RECEIVED UNTIL twelve o'clock noon, Pacific time, Thursday, May 31st, 1917, for the purchase of the timber upon three large tracts on the Klamath Indian Reservation in southern Oregon. Upon one tract containing two hundred and sixty million feet and upon another containing one hundred and seventy million feet, a minimum price of \$3.25 per thousand has been placed upon yellow and sugar pine, and upon the third tract of two hundred million feet, the minimum price for sugar and yellow pine has been made \$3.00 per thousand feet. The minimum for red fir is \$.75 and for white fir \$.50, but the cutting of these species is optional with the purchaser. The timber is nearly all yellow and sugar pine. The right to reject any and all bids is reserved. Full information may be obtained from the Superintendent of the Klamath Indian School, Klamath Agency, Oregon.

Washington, D. C., March 24th, 1917. CATO SELLS, Commissioner of Indian Affairs.

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AMERICAN FORESTRY

VOL. XXIII

MAY 1917

NO. 281

WAR, LUMBER AND SHIPS

WITHIN the three weeks that followed the decree by Congress that a state of war exists with Germany, no industry has moved more quietly, sanely and orderly than the great lumber industry of the United States in its efforts to bring ultimate victory to America, her allies and democracy.

Hardly had the United States entered the war when Lloyd George delivered his famous address in which he declared: "The road to victory, the guaranty of victory, the absolute assurance of victory, has to be found in one word, ships, and a second word, ships, and a third word, ships."

Both the commissions to America, that of England headed by the Right Honorable Arthur James Balfour, and the French headed by Marshall Joffre and M. Viviani since their arrival in America, have stressed the need of ships even more than has Lloyd George.

This imperative need, President Wilson decided, must be met by the construction of wooden ships of about 3,000 tons each, with a speed of about 10 knots an hour in the peaceful lanes of the oceans and 12 knots in the areas where submarines ply.

Here is a big order to fill. Obviously big men had to be obtained for the task and big men have been obtained. These men are William Denman, of San Francisco, chairman of the United States Shipping Board; Raymond Stevens, of New Hampshire; John A. Donald, of New York; Captain James M. White, of Kansas City, Missouri; and Theodore Brent, of New Orleans. General George W. Goethals, builder of the Panama Canal, is to supervise the construction of the wooden merchant marine, and the big lumbermen of the country are aiding him in his gigantic task.

One of the first things Mr. Denman did when he got down to the business of executing plans for the fleet was to call in the lumbermen of America. He got immediately into touch with every man of consequence in the industry, and these men laid aside their private business and came forthwith to Washington to give the Government the advantage of their experience.

From the forests of the Pacific Coast and the Northwest will go to shipbuilding yards the best of the hardy Douglas fir, the South will supply its yellow pine, and Maine will contribute its hard pine, for conversion into bottoms to carry food, and, if necessary, men, to America's allies over the seas.

One of the big men whose advice is proving of inestimable value to the Government is Frederick A. Eustis of Boston. Mr. Eustis has volunteered his services to the Government during the duration of the war, and is re-

ceiving a salary of \$1 a year. He is an expert on the country's lumber supply, its transportation to the shipbuilding yards, and is supplying this vast technical knowledge for the benefit of the Government.

Captain John B. White, of Kansas City, Missouri, noted lumber conservationist, also gave up vast interests to let the Government have his time in this critical moment, and every member of the Shipping Board and the big lumbermen of the country have done likewise.

Mr. Eustis believes that wooden ships can be built at the rate of 200,000 tons a month, beginning October 1, without interfering with the construction of steel vessels. His idea is to build them of green wood as fast as it can be cut. Only the best wood will go to the shipbuilding yards and the cut-back will be used for the regular construction in which it has heretofore been applied.

Mr. Eustis also believes that within from fourteen to sixteen months America can have between 800 and 1,000 of these vessels. He has figured upon the highest degree of destruction by the submarine and is confident that the steel vessel supply of the Allies makes them safe for 10 months longer, after which time he is confident our output of wooden vessels can keep far ahead of the highest ship mortality rate the U-boats can inflict.

To give an idea of the supreme task ahead of Chairman Denman, Colonel Goethals and their associates, it is only necessary to remember that wooden shipbuilding is an art. The work must be done in shipbuilding yards at ports on either the east or west coasts or at Great Lake ports. The ships cannot be riveted together as steel ships are. There are known to be only 12,000 expert wooden shipbuilders in the United States and 150,000 are needed. Hence 130,000 men have to be mobilized and educated to do the work.

From one million to one-and-a-half million feet of lumber will be required for each vessel, yet surveys by the Government have shown that the amount of timber required for the ships will hardly make a dent in our great forests, only about 2 per cent of the total lumber supply being used.

The fixing of prices by agreement on the lumber to be sold to the Government has been one of the problems, among the first steps being an exchange of messages between the Southern Pine Association, and the committee on raw material of the National Defense Board. The lumbermen have agreed to throw all their efforts to the assistance of the Government, and to establish maximum and minimum prices for lumber to be used in such directions as barracks, shipbuilding, and other war necessities.

The work toward the building of wooden ships is progressing rapidly, and many keels are being laid, and many more are soon to be added to those now building. Oregon builders have already arranged to build forty wooden ships, and are preparing to turn out completed ships of 1,500 tons each in six months, and 3,000-ton vessels in eight months. Ten new shipbuilding plants may be located at Portland alone, with many others at Puget Sound and Gray's Harbor points. Similar contracts are being made on the Gulf Coast, and all along the Atlantic, with the Maine shipyards getting a new lease of life.

The big task is to get the men to build the ships. There will be seen in hundreds of American shipyards scenes not unlike those which once were common in Maine before the steel ship all but preëmpted the seas. That every shipbuilding yard in the United States will be running at full capacity, right up to the minute, when the German government is forced to its knees is fully realized.

The foresight of the men in the lumber industry in preparing for all eventualities months ago is proving of great aid to the shipping board. More than 900,000 men are engaged in the lumber trade, two and a third billion dollars are invested in it, and the most recent Government census showed that there are 49,738 lumber plants in the country. Since the great war's first guns were fired in August, 1914, lumbermen have been casting about to study the lumber markets of the world and to fill their orders.

Before the war Germany was the second greatest exporter of lumber in the world, being exceeded only by England and her colonies. German efficiency—the combination of manufacturing, shipping and banking interests—was responsible for this. When the Federal Reserve law was passed and national banks began taking on foreign branch banks the lumbermen saw their opportunity for expansion. Then came the war with the total elimination of Germany as a factor and the curtailment of English activity in foreign lumber sale.

So lumbermen of the United States began to get strongly in the market. In 1916 42,000,000,000 feet were cut, and then only one-third of the sawmill capacity of the country was used. With this fact in mind the shipping board knows that lumber for the wooden vessels can be supplied, the domestic trade cared for, and plenty left for export.

Coöperating with the Shipping Board to facilitate dealings between the Government and the producers is a committee of lumbermen composed of R. H. Downman, of New Orleans, president of the National Lumber Manufacturers' Association, chairman, Henry S. Graves, chief forester of the United States; D. O. Marion, South Carolina; E. T. Allen, Portland, Oregon; E. A. Selfridge, San Francisco; George B. Lewis, Holyoke, Massachusetts; W. M. Ritter, Welch, West Virginia; G. S. Long, Tacoma, Washington; Charles S. Keith, Kansas City; J. F. Gregory, Tacoma, Washington; C. H. Worcester, Chicago; W. H. Sullivan, Bogalusa, Louisiana; and W. R. Brown, Berlin, New Hampshire.

That the forests of the United States will not only furnish the lumber needed for the new ships but will also take care of the domestic demand and allow the sawmills of the country to accumulate a surplus for reconstruction

in Europe when the war is ended and without noticeably depleting these forests is the belief of this committee. In fact, it is known that there is an over-production of lumber to-day and its increased use is badly needed.

If the plans of the Shipping Board and the lumbermen are carried out there is little doubt that the object of the submarine campaign will be defeated. In the part the United States is to take in helping its allies to victory, nothing is of so much importance as helping to combat the European food-shortage, for food ranks ahead of men, money and munitions. Plenty of ships will not merely fend off the enemy, but will smite him down by assuring the transportation of the necessary supply of food.

Observers see in the efficient manner in which lumbermen have taken up the task to which the President of the United States has called them an impetus which will last long after peace is declared and as an outgrowth of this activity a large merchant marine to care for America's peace overseas trade and carrying out America's foreign trade ambitions.

But the big task right now is to supply ships. The Shipping Board has \$50,000,000 at its disposal immediately. It has the brains of the best lumbermen in America and these two agencies have set about determinedly to do the work assigned.

The standard ship, the Shipping Board announces, will be about 280 feet over all, with a 24-foot depth of hold and with two full decks, and will be capable of developing about 1,500 horsepower.

Bidders may propose to furnish completed ships or hulls only. Any firm desiring to submit proposals to build completed ships from their own plans may do so, but such plans will have to be approved by the Board's engineers.

Scores of shipbuilders have assured the Board that they will take contracts up to the limit of their capacity, and many of them at this writing have sent inquiries as to how soon specifications would be submitted and bids accepted. It is understood that some of the delay has been due to revisions made at the suggestion of the visiting war missions, particularly in regard to means of protecting the vessels from submarines. On that feature of the construction the naval consulting board also is giving advice.

To permit builders to make tentative plans, it was announced that the standard dimensions would be about as follows: Length between perpendiculars, 260 feet, over all, 280 feet; extreme beam, 46 feet; moulded depth, 26 feet; depth of hold, 24 feet; two full decks, forecastle, midship bridge house and poop and house on bridge for officers, power, steam; 1,500 horsepower, single or twin screws.

SPRING planting plans for the Pennsylvania State Forests, allotting 3,800,000 forest tree seedlings for this year's reforestation operations, have been approved by Commissioner of Forestry Robert S. Conklin. In addition to these trees for the State Forests, about 1,750,000 will be distributed free of charge to private individuals and corporations interested in reforestation. Almost 400,000 of these trees will be used by water companies in reforestation barren water-sheds upon which boroughs and cities depend for their water supply.

A MILLION AND MORE FOOD GARDENS

IN order to "Do Its Bit" in answer to the call for the mobilization of the nation's resources in this war period, the American Forestry Association has decided to coöperate with the National Emergency Food Garden Commission. The work to be done is to secure the planting of a million and more food gardens. If successful, and there is every indication that it will be, this work will be of tremendous service in relieving the food deficiency and solving the vitally important problem of feeding the nation and helping the nation's allies. The earnest assistance of every member of the Association is requested.—THE EDITOR.

HOME gardens, small, inexpensive but abundantly productive, today are flourishing in every city, town and village in the United States. There are thousands upon thousands of them. Men and women, old and young; boys and girls, debutantes, college students and workers, are toiling in the army of "universal service" to the nation. Hoes and rakes, spades and sprays, hold equal honor with rifle and sword. Corporate wealth, the greatest industries of the land, the most eminent of statesmen, scholars and scientists have enlisted in the army of food producers. States and cities, with their legislatures and city councils, governors and mayors aiding, have responded to the home garden call. In truth, the virgin soil of the nation is being put to the greatest test in all history.

For two months the nation-wide campaign for the planting of a million and more vegetable gardens in back yards

and vacant lots, conducted by the National Emergency Food Garden Commission, of which Charles Lathrop Pack, president of the American Forestry Association, is president and which is working in coöperation with the Conservation Department of the Association, has been in full swing. In that period war between the United States and Germany has been declared, the country's resources mobilized, industrial and commercial conditions revolutionized and, through presidential proclamation and governmental plea, the people have been urged to aid in the production of food that this country may escape a food crisis such as has afflicted the war-rent nations of Europe. And the people have responded. The one great menace—the lack of food—was early appreciated, and while the Government sought to stimulate farm production, the National Emergency Food Garden Commission directed its attention to



HOME TOMATOES

This is not a view of a nursery, but one of the home gardens in Danville, Illinois, where home gardening is encouraged by the Civic Federation. The response of public-spirited societies to the appeal of the National Emergency Food Garden Commission this year is putting such gardens as this in hundreds of American municipalities. This is a patch of exceptional tomatoes, with clean and sturdy stalks, trim tops and heavy with fruit, and staked and cultivated with the precision of an expert florist. Yet a school boy did it.

city production, the organization of the city millions into a vast agricultural army for the creation of a million food gardens, and the campaign has assumed proportions beyond even the most sanguine expectation of President Pack and his colleagues.

Since President Pack inaugurated the garden campaign the heads of all the great Government departments have sent out warnings of a national food crisis. President Wilson, in his appeal to the united nation to undertake measures of conservation, dwelt with much force on the imperative necessity of home gardening. He pointed out that "every man, woman and child must help," that the "railroads must suffer no obstruction of any kind," and that "everyone who creates or cultivates a garden helps solve the problem of feeding the nations."

President Pack and his co-workers, men of eminent standing in the world of science and letters, had expressed views similar to those enunciated by the President. The Commission realized the significance of the crisis hovering over the nation,—realized that no matter what the yield of the farms, the great transportation systems of the country would be powerless to transport the products, and it was distinctly this view which found expression in President Wilson's appeal to the nation in its greatest hour of need.

Secretary of Agriculture David Houston, when reports from his field agents and statisticians poured in on him, was convinced of the menace which threatened the country. Prognostications from every source pointed to the danger of a failure of crops and consequently the failure of a nation to feed its people.

This situation was foreseen by the Commission, hence the urging, the pleading, and the imploration that the people as a whole turn to individual agricultural pursuits; that they convert back yards and vacant lots into vegetable gardens, and that those products be raised which might take the place of meat and other food

PRESIDENT WILSON'S CALL TO SERVICE

"**W**E must supply abundant food for ourselves and for our armies and our seamen, not only, but also for a large part of the nations with whom we have now made common cause, and in whose support and by whose sides we shall be fighting. * * *

"The world's food reserves are low. Not only during the present emergency, but for some time after peace shall have come, both our own people and a large proportion of the people of Europe must rely upon the harvests in America. * * *

"Let me suggest, also, that every one who creates or cultivates a garden helps, and helps greatly, to solve the problem of the feeding of the nations."

President Wilson's Proclamation, April 16, 1917.

products which the town and city dweller could not produce.

Such was the far vision of the Commission, and such was the beginning of a campaign which has spread from the Atlantic to the Pacific, and from Maine to the Gulf of Mexico. Governors of the biggest states in the Union, mayors of the most influential cities in the country (three hundred mayors assembled in

New York during the past month for the specific purpose of discussing and devising ways and means of mastering the food situation), great railroads of the East and the West, the mightiest corporations and industrial institutions of the country, the most eminent men and women of the social and official sets of thousands of communities, have all taken up the campaign of garden planting. The corporations and industrial and commercial institutions have procured land for their employes to till, have shouldered the expenses, that the food problem might be met. The big railroads induced their employes and those living along their lines to plant gardens and raise vegetables. Garden clubs, like a tented city rising during the night, were organized in every community, and so the movement spread, like a prairie fire until President Pack and his colleagues were forced to send into the various states field organizers, men who were experts in agricultural fineness, who might unite the various forces and inspire hearty and friendly coöperation that the food producing gardens might be of real benefit.

Nearly two thousand newspapers now are using daily planting lessons which are sent out from the Washington

headquarters of the Commission. These lessons are supervised by experts from the Department of Agriculture, and tell how, when and what to plant, and what must be done to insure a full and healthy crop. In scores of cities and in hundreds of villages and towns gardens are flourishing, and already fresh vegetables are being gathered for the individual households. The tiny "farmlets" are saving families



THE FOOD GARDEN HARVEST

No, this is not the first prize table in the exposition building at the county fair. It is just a neighborhood exhibit in Gloucester, Massachusetts, to show that the back yards are as fertile as the best farms. Any market gardener would be proud of such squashes, such pumpkins, turnips, tomatoes, and beets as these. To stimulate the growing of tons of such crops this year on the idle lands of cities, the National Emergency Food Garden Commission is urging civic organizations to conduct gardening competitions with prizes for the best crops grown.



MAKING CITY SOIL PERFORM

Not a large patch, but look how it grows. This boy took first prize in his class (children over 13 years of age) in the city-wide gardening contest conducted by Portland, Oregon. Productivity per square yard rather than gross produce or profits was the test. Rich soil and an exceptionally good location—on a well-drained southern slope—aided his success, but what he did can be approximated by the amateur gardener anywhere in the United States. In the distance can be seen another contestant on a bottom-land garden.

considerable money, and are proving of inestimable value to the Government. The good the movement thus far has accomplished cannot be measured adequately, for those who have embraced the opportunities offered by the Commission are perhaps enthusiastically over-indulgent in their praise, while others report they cannot conceive how the city millions could have met food conditions had not the garden idea been implanted in the hearts and brains of the people.

When the White House issued the garden plea the employes of the Executive Mansion immediately began plans for a garden. The Department of Justice gave permission to till a plot of ground opposite the White House, and President Pack sent to Nelson Webster, ex-

ecutive officer at the White House, \$100 worth of seeds. Mrs. Wilson, and members of social Washington, announced that only a three-course meal would in the future be served at formal functions. Garden clubs throughout the city of Washington began a systematic recruiting of boys and girls and men and women who were able to shoulder

a hoe and rake. Prizes have been offered for the most productive garden, and this phase also is being given much consideration in other cities. In Washington the campaign receives enthusiastic support, for it is realized, perhaps, that all governmental or nationwide campaigns of any character must at least have some connection with the capital of the nation.

But the work of the Com-

PLANT A GARDEN NOW

“WAR has now made the planting of food gardens an imperative obligation upon every American citizen who has access to land, no matter how restricted its area. The man, woman, or child who allows any soil fertility or available labor to go to waste this year deserves the opprobrium that goes to the military slacker. We are perhaps approaching the time when we must adopt meatless days either voluntarily or by governmental fiat. Let us see to it that the food substitutes for meat are produced independently of the farms by a great host of home gardeners. Because it is late in the season, do not neglect to plant a garden for that reason; prolific gardens may be seeded until July. Plant a garden now and help win the war.”—CHARLES LATHROP PACK.

mission has just begun, President Pack explains. William C. Redfield, Secretary of the Department of Commerce, says that the whole world is short of food supplies and that the future of civilization is dependent upon the crops of 1917. The war has taken from the fields of Europe the men needed to till the soil, and the women, though valiantly struggling behind the plow with that imperishable fire of



WHAT GIRLS CAN DO

In Europe the farming is now being done largely by women who have taken the place of men now at the front. In America this year girls are doing a great part toward realizing the ambition of the National Emergency Food Garden Commission—2,000,000 town and city gardens to insure sufficient food. These Pittsburgh children agree that girls make as good gardeners as their brothers or parents.

patriotism burning in their breasts, are unable to produce the food necessary for millions of hungry, desperate men who battle because they are told to battle.

The truth of the matter is that hunger stalks abroad, armies waver, and nations are trembling at their very foundations. For without food, revolution comes, and with revolution comes chaos and death and destruction to all alike. Without grain and meat from this country, and ammunition and arms, these latter the product of food-fed men, the nations of Europe must perish. The world knows this, and seeks not to discount the truth. There are periods in history when truth towers above all chicanery and petty artifices of diplomatists. Such is the case today. Sophistry is giving way to humble truthfulness. The cry for food is "heard around the world."

The one great question which now confronts the people of this country is whether the Government can cope with a problem the magnitude of which never before has any nation contemplated. Food is the one dominating, all-powerful creative force which holds the destiny of the civilized world within its grasp. President Pack and his fellow members of the Commission feel that the farmer and rancher cannot alone supply food in sufficient quantity to feed this and the great nations of Europe, and that it is urgently necessary that the millions of individual city dwellers continue with undiminished vigor the home garden cultivation campaign. Unless this is done it is believed not only by President Pack and his colleagues but by the

Government itself that a shortage of food will result that will cause national, and, indeed, international suffering on the part of millions.

The Commission feels that every man and woman, boy and girl, should "do his bit." The schools soon will be closing for the summer period. Hundreds of thousands of youths and young girls who heretofore have indulged in baseball, tennis, golf and other forms of outdoor life, should cast aside such indulgences and rush to the aid of their country by mobilizing in the ranks of food-producing toilers. As Disraeli once said, "Old age is unknown to genius," and so the Commission repeats in its appeal to the men and women who are unable to aid their country other than through cultivation of gardens, "take up the hoe and rake and make America efficient." Old men, veterans of past conflicts, may well shoulder the spade, may well devise new methods of food production, for the time for "universal service" to mankind is at hand. Age is no limit, no barrier to achievement. Milton was 57 and



A NEIGHBORHOOD POTATO PATCH

The summer school vacation of three months was originally a rural institution, invented by farmers to give their sons time to help with the harvesting. When city schools fell heir to the vacation habit the problem arose of keeping the boys busy. The food garden largely solves the problem, and the boys like it. Potatoes take too much room for a small garden, so this street in a Massachusetts town has a community potato patch, cultivated largely by the children.

blind when he wrote "Paradise Lost," Dante was almost 70 when he composed his famous epic, Haydn produced his sublime "Creation" at 68, while Verdi was past 70 when he wrote the score of "Falstaff." Names of others might be multiplied indefinitely to prove conclusively that men and women only outlive their usefulness when they think their usefulness is past. The Commission points to these examples merely as an illustration for the guidance of those who because of age harbor the belief that they are incapacitated for "duty." For, says the Commission, "We are old only when we think ourselves old."

Back in 1902 Rudyard Kipling lashed his countrymen for their blindness in not being able to see that the future was preparing for them just the fate that did befall when the world-war broke out. In the poem which Kipling called "The Islanders," and which might almost as aptly have been written for the United States, he said; "Ye set your

leisure before their toil and your lusts above their need." Twenty millions of men have been withdrawn from production, and today three million women in England and more than four million in France have been drawn into employments hitherto monopolized by men. Why cannot the women in this country through the home garden perform the same patriotic service their sisters over the seas are offering up to their kindred sufferers?

Within the past month there gathered in this country for consultation leaders of the British, French and American peoples. Our allies at Yorktown, our enemies at Lexington are both in accord in the presence of a common enemy, and their common cause—the feeding of their embattling forces—perhaps was the most momentous topic of the deliberations. Food makes the sinews of war. Today the food yield is insufficient for the 100,000,000 who



SOME PRIZE GARDEN CABBAGES

This determined-looking young gardener is Cliff Morton, who has the distinction of being the best farmer in a certain fertile county in the West. The camera caught Cliff in the act of defying the world to raise better cabbages than his. His farm is an acre within the corporate limits of the town where he lives and goes to school. The National Emergency Food Garden Commission calls attention to the waste land on the outskirts of cities and towns which might be donated for the garden use of those who can cultivate larger spaces than the average back yard.

populate the land; yet, this country not only is expected to feed itself but to provide food in abundance for its allies in arms. "Can this be done?" the world asks.

The National Emergency Food Garden Commission, which means President Pack and every single member thereof, feels that we are in this war, and we must win it. Victory in this war means ample FOOD SUPPLIES. An army is just as strong as its food supply, and not one bit stronger. Men who have not plenty to eat, cannot march and cannot dig trenches or fight. Our allies are pleading for food, but we have little food to spare and can only produce a surplus above our own necessities by the swiftest organization of labor and definite mobilization of an agricultural army on the firing line of the farms.

Thus with the winter crop of wheat a disappointment, with the wheat crop of the great northwestern states, called the "granary of the world," which soon will be

reaped, and which already is predicted a failure by Government experts; with Russia, the second largest producer of wheat in the world, with twelve million men under arms, barely able to produce enough to feed her millions; with England, France and Italy looking to this country for succor; with Argentina, upon which the consuming world has



OVER THE FENCE FROM THE FACTORY

The toiler who has hard work making his pay keep the family in food need not worry if he has a back yard as deep as these in South Bethlehem, Pennsylvania. The fence acts as a windbreak from the north, giving early maturity to plants. All these back yards are cultivated as gardens this year. The National Emergency Food Garden Commission is trying to turn every back yard of this sort into a vegetable garden.

long relied, placing an embargo on wheat and flour to protect her own people against the high cost of living; with the financial resources of all Europe almost exhausted; with the man resources of Europe failing the great war in truth has brought the whole world, neutral nations as well as belligerent, to the very verge of economic exhaustion.

The concrete situation before the American people today is this: What will be the result when the Government begins transferring our millions of stalwart laborers from the wheat fields to the battlefields? The calling out of the National Guard means a loss of 30,000 men to the agricultural states alone. What will it mean when the needs of the regular army and navy are supplied and universal training takes away from the farms the youth of our land? Shall we impoverish ourselves by this action?

The answer to this problematical situation, in the opinion of the National Emergency Food Garden Commission, and coincided in by the most important Government officials, from the Secretary of Agriculture down to his clerk-statistician, is home gardening. It is recognized that the agricultural yield of the farms must of necessity be utilized by the Government for military and industrial purposes, that the city millions then must endeavor to cope with the situation through individual effort, through the transforming of back yards, vacant lots and all untilled land into small productive vegetable gardens. In this man-

ner millions of dollars worth of food may be raised, the food yield of the nation thus becoming doubled, and the vast populations of the cities and towns and villages of the country will be self-supporting in a large measure. The movement already has gained much headway. Gardens by the thousands are flourishing, but gardens by the millions must spring up if the situation is to become permanently beneficial to a stricken world.

Aiding President Pack and Secretary Ridsdale in their efforts to assist the nation and the people to produce sufficient food are men of renown, including Luther Burbank, noted horticulturist, Dr. Charles W. Eliot, of Massachusetts, Dr.



A PRIZE CORN GROWER

The gardening ability of children is not overlooked in the campaign of the National Emergency Food Garden Commission for 2,000,000 home gardens this year. Children are the most numerous class who have much time to give to spade and hoe—but they are something more—they make splendid gardeners. Much of the heaven of better farming has been spread through many sections by the boys' corn clubs fostered by the Department of Agriculture. This is one of the prize winners—very proud of his crop.

Irving Fisher, of Yale, Fred H. Goff, of Ohio, John Hays Hammond, famous mining engineer, Fairfax Harrison, president of the Southern Railway, Hon. Myron T. Herrick, of Ohio, Dr. John Grier Hibben, president of Princeton, Emerson McMillin, of New York, Mrs. John Dickinson Sherman, of Chicago, Chairman, Conservation Department of the General Federation of Women's Clubs, A. W. Shaw, editor of *System*, of Chicago, Carl Vrooman, assistant Secretary of Agriculture, Capt. J. B. White, of the United States Shipping Board and a noted lumberman and conservationist, and Hon. James Wilson, former Secretary of Agriculture.

FORESTERS FOR NATIONAL DEFENSE

THE United States Forest Service is now bringing to bear every resource to assist the Council of National Defense and the military branches of the Government. "It is yet too early to give out details," stated Chief Forester Graves. "The Forest Service is, however, actively engaged along two broad lines—assisting the War Department through the use of our field forces in the protection of public property in regions remote from stations of the regular Army or the National Guard; and in coöperation with the Council of National Defense and its Advisory Committee on Lumber in the mobilization of forest supplies needed for the Army and Navy and the Shipping Board.

"Wood and wood products enter into the art of war to an astounding degree and to an extent hardly considered by the layman—for use in all manner of equipment, vehicles, airplanes and containers, for the manufacture of explosives, chemicals, surgical supplies and the like. Our problem is to marshal the great wood industries—lumber, hardwood specialties, naval stores, wood distillates, paper and pulp—to the end that the essential products of these organizations may be used to the highest advantage by the agencies charged with the prosecution of the war. In this work the Council of National Defense has secured active help and advice of prominent lumbermen who have in a very patriotic way volunteered their services."

The Executive Committee is composed of R. H. Downman of New Orleans, President of the National Lumber Manufacturers' Association; E. T. Allen of Portland, Oregon, Manager of the Western Forestry and Conservation Association; C. H. Worcester, of Chicago, President of the

Worcester Lumber Company; W. M. Ritter, of Welch, West Virginia, President of the Ritter Lumber Company; W. H. Sullivan, of Bogalusa, Louisiana, Manager, Great Southern Lumber Company and Henry S. Graves, Chief of the United States Forest Service. Other members of the Committees are D. O. Anderson, lumber manufacturer of Marion, South Carolina; E. A. Selfridge of San Francisco, President of the Redwood Manufacturers' Association; Geo. B. Lewis, lumber manufacturer of Holyoke, Massachusetts; G. S. Long of Tacoma, Washington, Manager, Weyerhaeuser Timber Company; W. E. Delaney, of Lexington, Kentucky, President, Kentucky Lumber Company; Charles S. Keith, of Kansas City, President of the Southern Pine Association; J. F. Gregory, of Tacoma, Washington, logger and lumber manufacturer, and W. R. Brown, of Berlin, New Hampshire, lumber and paper manufacturer.

Back of the census of the Government Forest Service men for war needs is a committee of professionals, members of the Society of American Foresters, named by the advisory council of that body for the purpose. Gifford Pinchot is chairman and associated with him are A. C. Ringland, Earle H. Clapp, and Herbert A. Smith of the Forest Service and Major George B. Ahern. E. T. Allen, forester for the Western Forestry and Conservation Association, is actively in charge of the gathering of information with regard to private and state foresters in his section.

Mobilization of the wood industries, as well as woodsmen, may well prove a very important work for experts in woods and the characteristics which fit them for certain special uses. A good many things—rifle stocks, saddle trees, supply wagons, planks for pontoons, wooden aero-

plane parts, and numerous other wooden articles—will be needed by our armies. The specifications must be drawn up, the proper woods selected, the proper methods and machinery for working them up chosen, and the actual work done. All this must be done quickly, and, to insure satisfactory results, must be supervised by experts.

An example shows how important a seemingly insignificant point may be. Early in the war a British buyer placed a contract here for more than a million rifles. Specifications called for seasoned walnut stocks. Such walnut could not be found, so the contractor turned to green walnut and began to make the rifles. But the green wood cracked and checked to such an extent that there was a ruinous loss of sixty per cent of the wood. It became imperative to kiln-dry the green walnut. The Forest Service expert was called in and by control of kiln conditions overcame the trouble and reduced the loss from sixty to one per cent. This Government will need hundreds of thousands of rifles. It will not even be able to secure green walnut, except at prohibitive cost. And so the new specifications will call, in all probability, for birch and before the birch can be used without excess waste there will be another problem for the Forest Service expert to solve. Similar problems will arise in the selection of suitable substitutes for the white pine planks, now unobtainable but since time immemorial considered the only wood for pontoons, and in supplying the demand for suitable woods in the manufacture of aeroplane propellers, now that the woods considered essential are becoming scarce to the point of exhaustion.

With the double purpose of best serving the nation's needs in the war and at the same time furnishing adequate protection for the forests of the West, the Western Forestry and Conservation Association has conducted a "Defense Census of Trained Woodsmen" among forestry men throughout that section. So simple and efficient has the plan proved itself that most of the state and private forest organizations throughout the country have taken it up. The result is that the nation has a splendid body of trained men ready to do the things which they can do best. Their abilities are not lost through random enlistment in military organizations not able to make the fullest use of them but are concentrated for special service, the demands of which they best meet.

With the dangers of the forest fire season directly ahead, it is also essential to know how many and what men will be available for forest protection work. Under certain circumstances forest organization men can be most useful where they are, not only in fire prevention but in guarding bridges, rail and telegraph lines and the like. In lumbering operations, particularly, are many foremen, engineers, woodsmen, and the like who are qualified for special service and who might be more needed in the woods than in a military organization.

The nature of their work places the majority of forest organization men ahead of the ordinary civilian in ability to care for themselves under adverse circumstances, to meet conditions with initiative, to handle men, horses, and supplies, and in other ways to give a good account of themselves under war conditions with the minimum of

officering and care such as must be given ordinary recruits. They also know much of organization and discipline. In addition to these fundamentals, most of them have special competence, if not in the accepted work of the soldier, in work no less necessary in military operations, such as mapping and reconnaissance, trail, bridge, and telephone building, signaling, scouting, packing, teaming, auto driving, use of fire arms, feeding and transporting men, etc. Many also have military experience. These qualifications make these men especially valuable.

THE FRUIT TREES OF PICARDY

By Alice Gertrude Field

Last May they held you captive,
Sweet orchard-trees of France,
Like fearless eyes your buds unclosed
On desperate mischance,
Looking on strife and sick heart-break
With gentle, steadfast glance.

The little dark-eyed children
Looked up and smiled at you.
Your gallant branches bloomed in grief,
Like France, gay, brave and true.
Cheered by your snowy burgeoning,
Her sad folk hoped anew.

Today your ravished soil is free,
Slight little trees of France.
Your people keep glad festival
With joyous circumstance,
And you, dear comforters, should toss
In rosy triumph—dance!

Your sacrifice was not in vain,
Brave martyred trees of France,
For your avenging countrymen
Sweep on in stern advance,
And through all time your sweet ghosts breathe
A fragrant Vive la France!

A NEW use for wood has been developed in the making of canoes by a new system. The new idea is the stamping out of the finished canoe, from veneer, instead of the old-fashioned manner of building up a canoe from ribs of prepared wood, and the cutting of the thwarts and gunwales, and the covering of the whole with canvas.

THE New York State College of Forestry has taken up a new line of work, in the opening of a course to teach city forestry, along lines of city forestation on practical lines, arboriculture, park administration and landscape construction. Summer camp work is part of the course, to give the students training in the real out-of-door work of the forest. The forestry school has just issued a technical publication on the hardwood distillation industry in New York, to outline the work being done in this State, which is one of the leading states engaged in this industry. The latest practice in the industry is reviewed as part of the work of assisting in the further development of the industry.

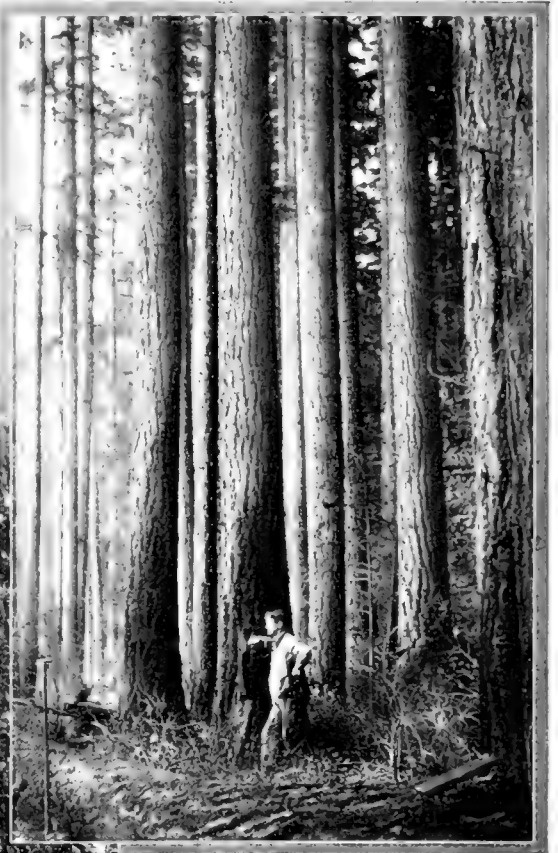
TIMBER CRUISING IN THE PACIFIC NORTHWEST

BY HERMAN H. CHAPMAN

THE enormous size and great value of individual trees in the coast forests of Washington and Oregon have led to the adoption of careful, detailed methods of timber cruising. The old-time cruiser, who produced his results by methods as mysterious as those of the professor of legerdemain, is giving place to the man who has a definite system and does not care who knows it. Timber cruising does not differ from other kinds of inventories or stock taking, except that it is immensely more difficult to obtain accurate and consistent results except at considerable cost.

The fundamental requirement in large and valuable timber is a count which will show the exact number of trees of each species on a "forty." Cruisers who attempt to estimate timber of this character by any shorter method cannot hope to attain even reasonable accuracy.

An example of modern methods is a report sent to the writer by the St. Paul and Tacoma Lumber Company, prepared by their timber inspector, Charles A. Billings, of Olympia, Washington, covering a section or square mile of heavy timber near Everett, Washington. The method employed by



YOUNG DOUGLAS FIR

This timber is mature for cutting and the stand has not yet begun to deteriorate or open up. Cruiser Charles A. Billings in the foreground.



SEMI-MATURE DOUGLAS FIR

This timber is typical of that found in the Puget Sound Region of Washington.

Mr. Billings was to divide each forty-acre tract into sixteen squares of $2\frac{1}{2}$ acres each. The center of each square plot was blazed with a cross and the plot numbered.

Then the cruiser counted every tree of merchantable size by the following classes: Douglas Fir, Young Douglas Fir, Red Cedar, Spruce, Hemlock, Cedar telephone poles, slow growth fir piling. For each of these classes, the average

diameter was arrived at, and the average merchantable length to nearest a 16-foot log. From these dimensions the contents of an average tree of this size was computed and the total stand determined in board feet by the Scribner Log Rule. These data were completed separately by species on each $2\frac{1}{2}$ -acre plot, with sixteen plots per forty, and sixteen forties in a section. This requires separate estimates on 256 plots to cover a single section, or over 9000 plots on a township of 36 sections.

The cruiser also estimates the per cent of the stand which will yield logs of three grades, respectively: No. 1, "merchantable," and No. 2, logging conditions are noted, a sketch map is drawn showing



RED CEDAR

This species is the source of nearly all the famous red cedar shingles shipped from the West Coast.

topography, streams and 50-foot contours, and the stumpage value of the timber is arrived at by determining the cost of logging the tract, and the value of the logs at the mill.

The estimating of timber is far from being a mechanical undertaking. Concerning his methods, Mr. Billings says, "To be a successful estimator of timber in the Puget Sound country requires much experience in actually logging said timber. A person should have had experience in felling and sawing into proper log lengths and measuring same after the hearts have been exposed, and carefully examining all the different indications of defect which appear on the surface of the tree, and which can be detected only by a person having knowledge of said signs, which indicate the condition of the interior. I have had seventeen years' experience in estimating the standing timber and have been able to check my estimates with the actual cut on many thousands of acres. I have compiled a table of the contents of standing trees which have several butts based upon a butt measurement four feet above the ground and under the bark, from thousands of measurements of different trees having different lengths and tapers. All measurements were made upon windfall timber or trees felled and cut up or sawed into log lengths in the logging camps. The top diameter of the first 32-foot log in very large trees is generally reduced about 14 inches for the butt dimension. Taper on each log above may be as much as 6 inches.

"Nearly all the different stands of timber differ owing to soil, exposure and altitude. Some have much longer and smoother bodies with less taper and a greater per cent of No. 1 logs. All this must be determined by the estimator when on the work.

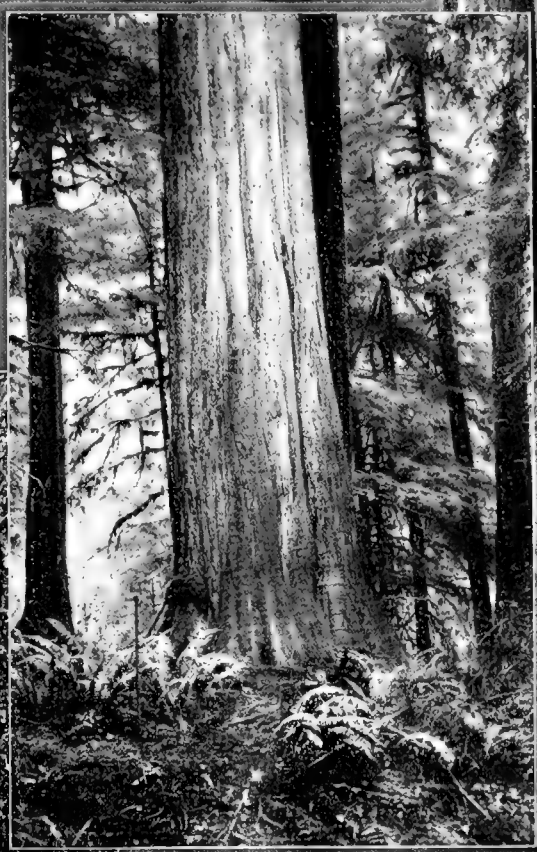
"I do not pretend to know all about the work. Ten years



MORE YOUNG DOUGLAS FIR
In this dense stand the trees average about forty inches on butts, three feet above the ground.



MATURED DOUGLAS FIR
Stands of this age begin to decline in vigor and are ultimately replaced by hemlock and cedar unless logged or burned.



GIANT RED CEDAR
This tree is seven feet in diameter and is in a mixed stand with hemlock. Note typical undergrowth of brake.

ago I considered I knew more about it than I do now. I have since concluded that there is much yet to learn."

The character of the stands requiring this detailed estimate may be judged by the accompanying photographs, which were taken by Mr. Billings on the various plots. There was found to be a total stand of 41,611,000 board feet of timber on this one section, or an average of 65,000 feet per

acre, valued, on the stump, at \$92,974.20 on the basis of stumpage prices varying from \$3.00 per thousand feet for No. 1 fir logs, to 50 cents per thousand for hemlock.

Mr. Billings' work is an example of the highest type of skilled timber estimating in which the cruiser combines the system and routine employed by a technically trained forester with knowledge of the character and defects of the timber. This report and the accompanying photographs were obtained through the courtesy of Mr. E. G. Griggs, of Tacoma, a vice-president of the American Forestry Association.

THE VIREOS

(Family Vireonidae)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

MAY is the month of migration. Ever since the last of February the birds have been moving northward, but it is not until this month that the flood-tide of bird migration passes over us. The early spring migrants are those that winter but a short distance south of their breeding range and have not far to travel, but the last of April and the first of May bring the birds that have been wintering in Central and South America. Wave after wave of bird life pours upon us; the woods and fields

The vireos do not come in a body by themselves but usually are mixed in with the flocks of warblers. They do not even come at the same time. The blue-headed vireo which winters in the Southern States is the first to arrive in the North; then come the warbling and yellow-throated species from Central America, while the red-eyed from South America is last to arrive.

The vireos are not brightly colored birds, but they wear greens, grays, and yellows in modest, pleasing combinations. Although not much larger than their brightly colored congeners, the warblers, they move about much more slowly, peering under leaves, examining crevices in the bark, or gleaning about the outer twigs in a thorough-going manner, usually singing as they go. Their larger heads and heavier bills likewise distinguish them.

With few exceptions the vireos are arboreal birds, fre-



A FEARLESS BLUE-HEADED VIREO ON ITS NEST

All of the vireos are confiding birds and will often allow one to stroke them while on the nest or even take worms from the hand like a pet canary.

are animated with a new influx of life; hedgerows and roadsides resound with song and demand our attention. We can step out into the open almost any cloudy evening, when the birds are flying low to escape the moisture-laden clouds, and hear their calls to one another as they wing their way northward under the protection of darkness. Some of them are flying high, others are flying so low that they barely skim the house-tops and a few ill-fated birds, confused by bright lights, dash themselves to death against tall buildings or become entangled in the meshes of telegraph wires.

The robins and bluebirds and blackbirds have been on their nesting grounds for nearly two months, many of the sparrows, the hawks, and the woodpeckers, have been common for some time, the ducks have come and gone, and now come the big flights of fly-catchers, warblers, orioles, thrushes, and vireos.



VIREO BUILDS FLOOR OVER COWBIRD'S EGG

Nest of a blue-headed vireo showing how a cowbird's egg was kept from hatching by having a floor built over it. The vireos suffer as much as any bird from the parasitism of the cowbird, but sometimes they circumvent disaster in this way.

quenting the shade trees of the city streets or small groves and wood lots, although they are not out of place even in the dense forests. They are almost entirely insectivorous, and to them, as much as to any other group of birds, is given the protection of the foliage. Leaf miners and leaf rollers, cankerworms, elm leaf beetles, gypsy and brown-tail caterpillars, and even the tent caterpillars are acceptable to them. In their seasons the berries of the elder and mulberry, wild cherries and even the hard blue berries of the Virginia creeper attract the vireos and make a welcome variation to the usual diet.

Vireos are great singers. They are singing when they come in the spring, and they continue to sing all summer, even after the exhausting moulting period has caused other

birds to cease. They sing under the hottest noonday sun when other birds are resting, and even on their way back to their winter homes, they indulge in snatches of their cheerful, measured music. Unlike the warblers, their songs are uniformly loud and musical, and though sometimes marred by a discordant chatter, they have a finesse unusual in bird music. Their songs, however, are simple, usually repeating the same phrase over and over with regular rests between each syllable. So measured is the time that it is rather easy to distinguish the songs of the common species by the rate of deliverance. The red-eyed vireo, for example, calls: "Look up"—1, 2, 3—"way up"—1, 2, 3—"tree top"—1, 2, 3, etc., while the yellow-throated vireo, which has a somewhat harsher song, delivers it more slowly: "Cherries"—1, 2, 3, 4, 5—"sweet cherries"—1, 2, 3, 4, 5, "have some," etc.

This method of singing has given them the name of "Preacher birds" and, as Wilson Flagg has well said of



BUT THE COWBIRD WAS PERSISTENT

The same nest containing two eggs of the vireo and two more of the cowbird. The cowbird's eggs are larger and heavily speckled. These eggs were removed, but later another cowbird found the nest and the result is shown in the next photograph.

the red-eyed vireo, "his style of preaching is not declamation. Though constantly talking, he takes the part of a deliberate orator, who explains his subject in a few words and then makes a pause for his hearers to reflect upon it." The songs of the warbling and the white-eyed vireos are exceptional, for the former indulges in a single, long, musical warble, similar to the song of the purple finch, except that it has a rising inflection at the end, while the latter, being an excellent mimic, often combines the songs of other birds with his own, into an indescribable jumble of musical cadences.

The nests of vireos are basket-like structures hung in the forks of the smaller branches. They are built of strips of grape vine bark and fibers, such as the milkweed supplies, skilfully fastened together and bound in place by spider or tent caterpillar webs. One can be fairly certain of the species of the nest by its position in the tree or shrub.

The white-eyed vireo, for example, always builds its nest in berry bushes or tangled thickets within a few feet of the ground. The red-eyed vireos nest on the lowest branches of trees or in young saplings from five to ten feet from the ground. The warbling vireo builds high in a full-grown tree toward the tip of the branches, while the yellow-throated builds near the trunk or one of the main branches, hanging its nest in the fork of a small shoot. The eggs of vireos are always white with just a few specks of black about the larger end.



—AND THIS IS THE RESULT

The young cowbird now ready to leave the nest of the blue-headed vireo from which it has long since crowded the rightful young.

The whole vireo family is very commonly parasitized by the cowbird, a species of blackbird, which, like the European cuckoo, builds no nest of its own but always deposits its eggs in the nests of smaller birds. The cowbird's eggs are easily distinguished because they are larger and heavily speckled with brown, but, in spite of the great dissimilarity, the vireo seems not to recognize the difference and never throws the egg from the nest. If, however, the cowbird deposits an egg before any of the vireo eggs have been laid, the vireo seems to realize the intrusion and will often build a floor over the cowbird's egg and thus prevent its hatching, or it may even desert its nest and build another. Apparently the vireos cannot count higher than one, and, while they recognize the difference between an empty nest and one containing an egg, they do not seem to differentiate between one egg and two, or between two and three.

If the cowbird's egg hatches it is seldom that even one of the young vireos reaches maturity, for the young cowbird quickly outstrips them and gets all the food, so that they are either starved to death or crowded from the nest. The vireo, however, is no less faithful to this changeling



A RED-EYED VIREO

This bird is repairing its nest during incubation. The vireos' nests are built of strips of bark and plant fibers skilfully woven together and bound into place by means of spider-webs and the webs of tent caterpillars. Here the bird is repairing its nest that has become loosened by swaying in the wind.

than to her own, in fact, she seems quite proud of her prodigy offspring and continues to answer its cries for food long after the cowbird is larger than its foster parent and should be caring for itself. The accompanying photograph of a blue-headed vireo's nest shows how the first cowbird's egg was buried in the bottom of the nest by the



A YELLOW-THROATED VIREO

This bird is stepping onto its nest in the fork of a chestnut tree about twenty feet from the ground. The yellow-throated vireo is a common bird of the shade trees, even along city streets, where its musical notes are heard much more often than the bird is seen. It hangs its cuplike nest in the fork of a small branch sprouting from one of the main limbs usually toward the center of the tree.

addition of a second floor. Later, after the vireo had deposited two eggs of her own, two more of the cowbird's eggs appeared. These I removed, but, nevertheless, when I returned about three weeks later, hoping to study a family of vireos, one young cowbird was all the vireos had to show for their labors. Still another cowbird's egg had been deposited in the interim and the ugly intruder here pictured had crowded the rightful young from the nest.

All of the vireos are trustful birds, seeming to have little fear of man. They sometimes nest on branches close to windows and often allow one to stroke them when on the nest.

The three commonest vireos are the warbling, red-eyed, and yellow-throated species. The first two resemble each other closely, being greenish above and pure white below. The red-eyed, however, has a grayer crown and a black line through its eye. The warbling vireo usually keeps to the tree tops, where its loud warbling song can be heard even in the heart of big cities, though the bird itself



Photo by G. C. Embury

A WHITE-EYED VIREO AT ITS NEST

This vireo is an aberrant member of the family, nesting in thickets and berry bushes.

is seldom seen. There, likewise, it hangs its cuplike nest. The red-eyed vireo is more at home among the lower branches or even in the undergrowth of woodlands, although it, too, makes the best of city parks, where it has to consort with the warbling vireo on account of the lack of undergrowth. The yellow-throated vireo is easily distinguished from these two by its yellow throat and breast, resembling more some of the warblers. The blue-headed vireo and the less common Philadelphia vireo are more northern in their breeding range than the others, and prefer woodlands for their homes. The blue-headed species is quite distinct from any of the others with its bluish-gray head and white eye-ring, but the Philadelphia closely resembles the common red-eyed, even in its song. Its under parts, however, are lightly suffused with greenish-yellow, and its song is somewhat weaker and higher pitched. The eastern and southern white-eyed vireo and the Bell's vireo of the Middle West are aberrant members of the

family which frequent thickets and berry patches from which they scold at every passer-by in an amusingly impudent manner. The white-iris of the white-eyed vireo is quite distinct in the fields, indeed much more so than the red iris of the red-eyed species, and gives the bird a quizzical expression.

Several other species of vireos are found in the South

and in the West and their numbers increase through Mexico and Central America, reaching their maximum abundance in the tropics, where the majority of the one hundred or more species are found. Vireos are confined to the New World and find their nearest relatives either with the waxwings or the shrikes.

A FOREST RANGER COURSE FOR THE SOUTHERN APPALACHIANS

THE Lincoln Memorial University in the Cumberland Mountains at Harrogate, near Cumberland Gap, Tennessee, has lately organized under the guidance of Henry S. Graves, Forester of the United States, a department of forestry with the purpose in view of furnishing a training suitable to the needs of farmers and other owners of woodland; one which will equip boys as rangers in government, state, or private employ.

As a forest laboratory, in which the students will do their practical work, the University has secured a timber tract of 2080 acres extending along the picturesque Cumberland Mountains from Cumberland Gap, Tennessee, east into Virginia. This tract will offer many problems for the students to solve. At present the reserve contains many thousand feet of merchantable timber, a large part of which is mature and will be cut as soon as possible.

No attempt will be made to develop a type of forestry school comparable to those in Northern Universities. The course will cover one year of twelve months divided into four terms of three months each. Each term is made a unit in itself so that a student who may have to drop out of the course before its completion will have a definite knowledge about at least some one phase of the practical work which will be of use to him in securing a position.

The largest part of the instruction will be given in the forest or in connection with practical field problems. The course will cover the following subjects:

1. Elements of forestry; a class-room course, supplemented by field excursions designed to show the student the fundamental needs and purposes of forestry, the relation of forests to water resources, the effect of forest destruction, the benefits to a community in maintaining forests in a productive condition, etc.

2. Forest botany; an elementary course to acquaint the student with the different species of trees and shrubs occurring in the forest, and their distinguishing characteristics.

3. Elementary field surveying, designed to train the student in making simple land surveys by the use of an ordinary compass, in simple levelling, etc.

4. Forest protection, with emphasis on practical measures to protect forests from fire and depredations of insects.

5. Timber cruising and mapping; a practical course to train the student in determining the amount of

standing timber on a tract, to appraise its value, and to record the information on maps.

6. Logging and scaling; a practical course in methods of logging and measuring the volume of logs.

7. Manufacturing and marketing of products; a course especially adapted to the conditions in the Southern Appalachians.

8. Silviculture; a course dealing with the methods of the care of woodlots, cutting timber in a way to secure natural reproduction, the making of thinnings to improve the stand, and practical reforestation.

9. Forest improvements; a course, principally in the field, in the construction of trails, telephone lines, and other improvements needed in forest protection, and elementary work in the construction of roads.

10. Elementary land law; a brief course designed to acquaint the student with the land system of the South and simple land law with particular reference to titles, transfers of property, contracts, etc.

The University is fortunate in being situated as it is among the mountains of northeastern Tennessee, since it draws upon a fine type of men, for forest work, men who are strong, active, used to the forests and mountains and know how to combine their hands and minds in solving the problems placed before them.



LINCOLN MEMORIAL INSTITUTE RANGERS

A group of the boys who are learning enough forestry to give them a working knowledge of the proper way to handle woodlands in connection with farms and also to make them eligible to places as forest rangers.

THE OAHU RAIN FOREST

BY VAUGHAN MACCAUGHEY

YOUR first view of the island of Oahu in the Hawaiian group is predestined to disappointment. During the lazy steamer week of tranquil blue Pacific you have indolently recalled all you ever read or heard of the alluring "South Seas." You picture the coral beaches, the langorous palms, the smiling forest against far purple peaks; surf lullaby and throbbing bird song; hospitable natives whose child-like pleasures and occupations sweetly link them to their bounteous and ever-smiling Nature Mother. Pleasant day dreams, these, for you are sailing to the isle of Paradise.

The last morning of the serene voyage dawns. As you are in your cabin, dressing, and packing your grips, a friend excitedly calls down to you. You rush on deck,—and in that shattering instant your iridescent dream-picture of tropic isle is irretrievably broken! You gaze at arid, weary, time-scarred headlands. A heavy surf beats relentlessly against the barren cliffs. The lonely shore is branded by melancholy sphinx-like craters and black dead lava flows. The bare soil is parched and red, as though burned and reburned in fierce plutonic furnaces. Where are your shimmering forests? Your sunny strands . . .

your friendly palms? Here are no signs of habitation, save the lonely lighthouse. It is a dead land—the volcanic fires have long been drawn, leaving to corrosive wind and water the demolition of its clinkered cinder heaps. And this is Paradise Isle!

The steamer, running slowly now, and standing well out from the surf-marked reef, rounds Diamond Head.

With delightful smoothness the panorama is metamorphosed by life and greenery. Now you look far back into magnificent sunny amphitheatres, hung with forest drapery, and scored by shining waterfalls. The valley floors are bright with the vivid green of the wet-land crops; their stately portals open onto the basking lowlands. Bold ridges separate these lovely vales and rise majestically to the cloud-capped mountains of the interior. Your sea-weary eyes are charmed by the rich and diversified green of the unbroken forest, that like a sumptuous tapestry drapes the mountains, ridges, and valley walls. This is Oahu's rain forest—this is the crowning scenic glory of the Purple Isles.

Before one can intelligently view this radiant mountain mantle one must know something of Oahu's volcanic history. This island is formed of two ancient crater masses—Waianae and Koolau. Waianae is much the older of the two and existed long before the Koolau Range rose up out of the sea. In that early period the Waianæ supported luxuriant forests, well-watered by abundant rain from the perpetual cloudcap. When the great Koolau volcano reared itself to the wind-

ward, it shut off from the Waianæ the rain-bearing trade winds. The Waianæ thus gradually lost most of their original forest cover; the Koolaus received very heavy precipitation, and were soon mantled by the beautiful humid forest.

My first trip into the Koolau Mountains elucidated the term "rain forest" and the relation of this forest to the zones of plant



DEEP IN THE RAIN FOREST

It is a dwarf forest appearing very rich when viewed from the lowlands but in reality made up of short, gnarled trees and tall, stout shrubs



LOOKING TOWARDS THE SEA FROM A HIGH RIDGE

During the rainy season in the Rain Forest landslides are common. They usually start near the top of a slope and cut straight narrow wounds down through the forest blanket.

life that lie below it. Leaving Honolulu at early morn, our party of four men traversed the narrow lowland, with its wealth of exotic vegetation—banana plantations, papaia orchards, flooded rice and taro patches, guava thickets, algaroba groves. A half-hour's walk brought us to a grassy foothill—the seaward outpost of one of the long ridges that rise to the main summit of the range. The foothills are dry and hot, and are covered with an uninviting, stultified growth of coarse grasses, thorny lantana, prickly cactus, and other pugnacious weeds. These tough and dogged vagabonds have exterminated from Oahu's lowlands most of the indigenous vegetation.

When we reached the lowerskirts of the forest we gave a shout of relief and sat down amidst the fragrant ginger beds in the cool moist shade of a *kukui* grove. The gray trunks, wide-spreading boughs, and shady domes of silver-green foliage were so soothing after the glare and sterility of the foothills that with reluctance we resumed the laborious climb. A few upward steps lifted us from the tranquil twilight of the trees into the brilliant sunshine that poured down upon the ridge trail. The comb of the ridge was very narrow, never exceeding a few feet in width, and dropped abruptly on either side into the deep valleys. The ridge itself was overgrown with bushes and stunted trees.

We were now in the rain forest, the fourth and uppermost of the plant zones that engirdle the mountains. It begins at an elevation of 1500 to 1800 feet, and extends to the ragged skyline of the Koolaus, which reach three thousand feet. The appropriateness of the term "rain forest" soon becomes evident to us. Although but mid-morning, the sunshine was at first deadened and then completely hidden by the dull gray fog that rolled down over the ridge. The cumulus clouds that an hour before



THE TAPESTRY FOREST

Deeply eroded ridges and gulches in the Rain Forest of Oahu Island. So steep are these luxuriously wooded slopes that they have aptly been termed "tapestry forests."

and in equally soggy shoes and clothing retraced our trail to the sunny lowlands of Honolulu.

This trip was our introduction to the chief factors in the formation of Oahu's forest mantle—abundant fog, frequent rains, temperatures much lower than those prevailing on the subtropic plains. The soil on the steep slopes and ridges is water-soaked throughout the year. The dense, squat, stunted woody mantle that maintains itself

under these strange conditions is itself perpetually humid. The rain forest occupies the region of maximum rainfall, and in this zone the annual precipitation is astounding, attaining a yearly average of several hundred inches.

The continuous humidity of the rain forest encourages a profuse undergrowth of ferns, mosses, liverworts, and other lowly plants. Trunks and branches are envel-



A RADIANT MOUNTAIN MANTLE

A densely wooded ridge in the Rain Forest zone, Oahu Island, elevation about 2200 feet. These forests from a distance look wonderfully rich, but the average height of the forest growth is well under thirty feet.

oped in dense layers of delicate, water-saturated vegetation. One may pull off a great handful of this material and wring a stream of water from it as one would wring a wet sponge. These clumps and festoons are veritable creations of the mist—beautiful translucent green, and exquisitely delicate in the form and texture of their foliage. Many of the epiphytic ferns

are so small, fragile and translucent that they resemble large mosses rather than ferns.

The forest is composed of a considerable variety of short, gnarled trees and tall, stout shrubs. In stature it contrasts strikingly with the very tall tropical forests of such regions as the Amazons and Java. It is a dwarf forest, a stunted formation, appearing very rich when viewed from the lowlands, but under close inspection revealing all the ecologic earmarks of restrained development under relatively adverse conditions. The steep slopes which it covers; the thin, wet, humus-lacking soil; the comparatively low temperatures; the poor insulation due to prevailing fogs; the repressive influence of strong continuous winds; the endless repetition of landslides and reforestation, as the valleys relentlessly eat back into the mountains; all of these conditions have tended to prevent the growth of large trees. The average thickness, or height, of the Oahu forest blanket is well under thirty feet. This contrasts with the splendid *ohia lehua* forests on the island of Hawaii, which rise to a height of one hundred feet, many individual trees attaining one hundred and fifty feet.

In these forests there are absolutely none of the familiar continental trees, and none of Hawaii's indigenous trees occur upon the mainland. The old-time Hawaiians were good woodsmen, and had specific names for most of the trees; for example, kukui, koa, lehua, hoawa, alani, hame, kawau, olomea, ohe-ohe, lapa-lapa,



FOREST TRAIL THROUGH A KUKUI GROVE

Note the shade and the beautiful undergrowth. Here the rainfall reaches the maximum, the annual precipitation is astounding, attaining a yearly average of several hundred inches.

pukeawe, lama, kopiko, etc. The forest canopy is a rich blending of greens of many hues, but these hues are its only wealth. In blossoms it is poverty-stricken. Like the tropical forests of many other regions, it is a flowerless forest. Not botanically flowerless, for of course every plant at its season puts forth flower and fruit, but flowerless in the artistic sense.

The flowers are, with few exceptions, small, greenish, inconspicuous, infrequent, scentless. One may clamber all day along the steep ridges of Oahu's rain forest, and see scarcely a dozen beautiful blossoms.

Many of the wooded slopes are exceedingly steep. These forested walls are so precipitous, and mask so many impassable cliffs, that the phrase "tapestry forest" correctly designates their aborescent drapery. One's first trips are made in momentary expectation of seeing the thickly wooded cliffsides drop down like a green garment, and expose the naked brown lava-body below. This very stripping off of the forest does occur, not in any spectacular manner, but intermittently here and there throughout the range. The slippery soil is a thin and easily-separated skin over the lava substratum from which it is decomposed. During the rainy season, when the whole range is water-soaked, landslides are common. They usually start near the top of a slope and cut straight narrow wounds down through the forest blanket. Sometimes a single hillside will be scarred by a dozen of these savage claw-marks; adjacent slopes may long remain unscathed. The scars vary in width from twenty to one hundred and fifty feet, and in length from several hundred to a thousand feet. They cut through to bed-rock, like a slash to the bone, and are therefore slow to heal. Little by little the mosses, ferns, and grasses creep over the raw rock, and finally, after many seasons, the moist forest closes above the ancient wound. Thus the perennial green tapestry mends its own rents, and so serenely beautifies the fire-built Pacific Islands.

ON parts of the Angeles National Forest in California the packrats are so abundant that many of the young pines planted by the Forest Service have been killed or injured by the rodents. The damage seems to take place chiefly in the late summer and fall and is more extensive in dry than in wet seasons. It is thought that the rats tear off the tender bark of the trees to obtain moisture at times when water is scarce.

RETURNS from 160 wood-pulp mills throughout the country, received in connection with the census of pulp-wood consumption and wood-pulp production being made by the Forest Service in coöperation with the Newsprint Manufacturers' Association, show that the reporting mills used in 1913, 419,000 cords of wood and had an output of approximately 2,229,000 tons of pulp.



CASCADE PASS, WASHINGTON

Cascade Pass, below Glacier Peak, Washington, is one of the most beautiful and awe-inspiring mountain sights in the Northwest. The peak is a rugged mountain mass, 10,436 feet above sea level, according to the United States Geological Survey, and the so-called "pass" is an eternal glacier, a great river of ice, moving slowly down its steep valley. The timber line creeps up to the very foot of the glacier, represented by majestic mountain spruce and sugar pines 100 and 150 feet in height. The melting ice from the glacier finds its way into the Wenatchee River which, miles further down, is utilized for the irrigation of the fertile valleys of the Evergreen State.

THE SUGAR PINE

IDENTIFICATION AND CHARACTERISTICS

BY SAMUEL B. DETWILER

THE "Man of Grass," as the Indians styled David Douglas, the intrepid English plant collector, discovered the Great Sugar Pine ninety years ago. These "truly grand" pines were too tall to climb, so the botanist used his gun to bring down several of the large cones for his collection. The fusillade quickly brought eight painted and well-armed Indians on the scene, who displayed unmistakable signs of hostility. Douglas modestly records the incident in his journal: "I came on an abundance of *Pinus lambertiana*. I put myself in possession of a great number of perfect cones, but circumstances obliged me to leave the ground hastily with only three—a party of eight Indians endeavored to destroy me."

Douglas named this magnificent tree *Pinus lambertiana* in honor of his friend Doctor Lambert, a distinguished botanist and author of a noted work on pines. Forty-two years after Douglas' exciting discovery of this tree, John Muir, a man whom his friends loved to call "John o' the Mountains," made his first trip into the Sierras. He has left us a legacy of the most beautiful and vivid word pictures of our Western wonderlands. At a meeting of the Sierra Club, he gave the following account of his first acquaintance with "the Sun-tree of the Sierras":

"For the first time I saw the giants of the Sierra woods in all their glory. Sugar pines, more than 200 feet high, with their long arms outspread over the spiry silver firs and the yellow pine, libocedrus and Douglas spruce. . . . The sugar pine seemed to me the priest of the woods, ever addressing the surrounding trees—everybody that has ears to hear—and blessing them. Few are

altogether deaf to the preaching of pine trees. Their sermons on the mountains go to our hearts; and if people in general could be got into the woods, even for once, to hear the trees speak for themselves, all difficulties in the way of forest preservation would vanish."

The extreme geographical range of the sugar pine covers a narrow strip about 1000 miles long, extending from Marion county in western Oregon, through the Sierra and Coast Ranges of California to Mount San Pedro in lower California. While it is not entirely a California tree, like the Big Tree, the Golden State contains the

principal wealth of sugar pine. Of the three most important lumber-producing trees of California, sugar pine ranks below redwood and western yellow pine in quantity of standing timber and annual output of lumber, but in money value it holds first place. The amount of standing sugar pine timber of commercial value as reported by the Forest Service is about three billion feet in southwestern Oregon and thirty-nine billion feet in California. While there is a large amount of sugar pine in the forests of the Coast Range north of San Francisco, the great bulk of the timber is found in the Sierra Nevada Mountains. The largest individual trees and finest bodies of sugar pine are found on the western slopes of the Sierra Nevada Mountains from Tulare to Eldorado counties, California. The Sierra forests are noted the world over for their variety and magnificence. Helen Hunt Jackson has given us a beautiful description of her first impression of this wonderful region: She says: "Now we began to climb and to enter upon forests—pines and firs and cedars. It seemed as if the whole



A GIANT SUGAR PINE IN THE ANGELES NATIONAL FOREST, CALIFORNIA

This is a splendid specimen, six feet in diameter, and is typical of the tree at its best. It shows very clearly the characteristic bark, deeply and irregularly furrowed into long, narrow plates, as well as the huge cone, by which the sugar pine may be instantly identified.

world had become forest, we could see off so far through the vistas between the tall, straight, branchless trunks. The great sugar pines were from one hundred to two hundred and twenty feet high, and their lowest branches were sixty to eighty feet from the ground. The cedars and firs and yellow pines were not much shorter.



VETERAN SUGAR PINE NEAR PROSPECT, OREGON

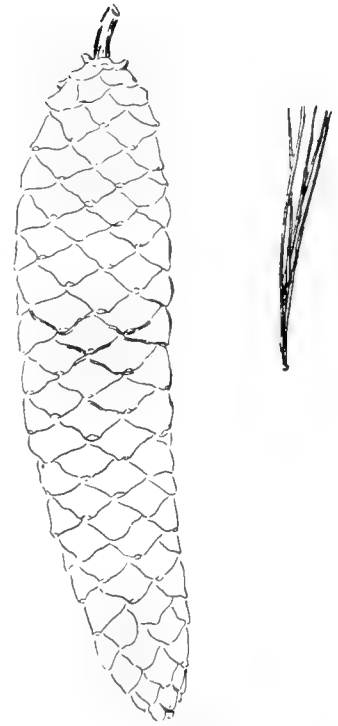
A giant sugar pine, seven feet ten inches in diameter at breast height, growing in the Crater National Forest, Oregon. The clear, straight trunk is characteristic of sugar pines, and is one of the reasons why this species ranks as the most valuable timber tree of the Pacific Coast.

The grandeur of these innumerable colonnades cannot be conceived. It can hardly be realized, even while they are majestically opening, receding, closing, in your very sight. Sometimes a sunbeam will strike on a point so many rods away, down one of these dark aisles, that it is impossible to believe it sunlight at all. Sometimes, through a break in the tree-tops, will gleam snowy peaks of Sierras, hundreds of miles away; but the path to their summits will seem to lead straight through these columns of vivid green. Perspective becomes transfig-

uration, miracle when it deals with such distance, such color and such giant size. It would not have astonished me at any moment, as I gazed reverently out into these measureless cloisters, to have seen beings of Titanic stature moving slowly along, chanting service and swinging incense in some supernatural worship."

Sugar pine is the tallest and largest of all the pines. It sometimes grows to a height of 240 feet with a breast-height diameter of 11 feet. The average sugar pine is 175 feet high and 4½ feet in diameter. The mature trees have straight, cylindrical trunks and frequently are clear of branches for 50 to 80 feet. Young trees have a tapering stem, and the branches develop in whorls of five, so that at first the trees, although graceful and flexible, have the regular, spire-like outline of most young conifers. Old patriarchs resemble the old white pine trees of our Eastern forests in developing a marked individuality of form. The tops become flattened and often develop more on one side than the other because of the constant pressure of the prevailing winds. Here and there great branches feathered with short, pliant tassel-like twigs, reach out at nearly right angles to the trunk, sometimes to a distance of 30 to 40 feet. The title "Priest of Pines" is appropriate for this tree whose giant plumes, aloft upon their mighty shafts, are most suggestive of sublime beauty and tranquillity.

The bark of young trees is thin, smooth and ash-gray in color. Later the bark is thick, deeply and irregularly furrowed into long, narrow plates. The old bark is of an attractive purplish hue which becomes red-brown where the wind blows away the small scales on the surface of the bark. Sugar pine is a member of the white pine group, hence the needle-shaped leaves occur in clusters of five, en-



CONE AND NEEDLES OF THE SUGAR PINE

It requires two years for the seed of the sugar pine to mature, and when fully developed the cones are of startling size—sometimes nearly two feet long, the average length being from 12 to 18 inches. The needles are dark green, stout and stiff and from 2½ to 4 inches long.



AREA OF SUGAR PINE GROWTH

California contains the principal wealth of sugar pine, although commercial stands are found in southwestern Oregon. The extreme geographic range of sugar pine is shown in the outline. The great bulk of the timber is found on the western slopes of the Sierra Nevada Mountains, especially from Tulare to Eldorado Counties, California.

closed at the base in a paper sheath. The dark green needles are $2\frac{1}{2}$ to 4 inches long, stout and stiff. Sugar pine received its name from the res'n that exudes from the bark. When it is injured, white, crisp globules are formed which are palatable and sweet to the taste, but which should be eaten in limited quantities.

Early in the spring the light yellow pollen-bearing flowers add a touch of brighter color to the dark foliage. These flowers are one-half inch to an inch long, borne in clusters on the young twigs. The cone-producing flowers are light green, appearing two or more together at the tips of the branches. It requires two years for the seed to mature, and when fully developed the cones are of startling size — sometimes nearly 2 feet long, and with an average length of 12 to 18 inches. Drooping from the extreme ends of the branches, the young green cones resemble the weights of a Swiss clock. When the scales expand to permit the seeds to disperse, the trees resemble huge Christmas trees strikingly decorated with shining brown cone ornaments, making it easy to recognize this tree from near or far. The cones contain 200 to 400 dark brown seeds nearly as large as grains of corn, but plump and containing an edible kernel that is relished by human beings as well as an army of squirrels. The seeds have a short and very broad wing attached to one end. The seed is seldom carried by the wind to a greater distance than the height of the tree.

Sugar pine has a strong, widespreading root system, and is not often uprooted by wind storms. As with other forest trees, forest fires, grazing animals, snow and other agencies at times cause serious damage to sugar pines. Insects an-

nually destroy large quantities of merchantable sugar pine timber, the principal losses being due to several kinds of bark borers. At present the damage caused by fungi is of minor importance, but since sugar pine is one of the hosts of the white pine blister disease, there is a possibility that this destructive parasite may be intro-

duced into the West from the eastern white pine region and cause great loss.

Sugar pine is usually found growing with western yellow pine, or Douglas fir, and white fir, and less important species, such as incense cedar and Jeffry pine. Its best growth is where the annual rainfall is 40 inches or more. It has been found growing at an altitude as low as 600 feet above sea level and as high as 11,000 feet. The merchantable stands are found at altitudes of 3,000 to 6,000 feet in the northern Sierras, and from 5,000 to 9,000 feet in the southern Sierras. Young sugar pines require partial shade, but as they mature they demand an increasing amount of light. Rapid growth depends on an adequate supply of moisture in the soil and air. The tree grows on many kinds of soils but avoids hot and dry slopes or wet and poorly-drained situations, and prefers moist, loose, deep sandy loam.

Sugar pine grows most rapidly between the ages of 80 and 100 years. In the virgin forest the average size of a 100-year old tree is 18 inches in diameter, breast height, and 90 feet high. Because of the dense shade, growth in virgin forest is very slow during the first half century. The average height of a 40-year-old tree is only about 5 feet, as determined by numerous measurements made by the Forest Service. Occasionally sugar pines live to be 600 years old, but most of them do not live beyond 500 years.



SUGAR PINES (*PINUS LAMBERTIANA*) NEAR STRAWBERRY, CALIFORNIA

Two sugar pine trees growing in the Stanislaus National Forest, California. Sugar pine belongs to the white pine group, having five leaves in a cluster. In addition to its high commercial value, it is a very beautiful tree. It is gratifying that the Federal Government has declared a quarantine against shipments of white pine, currant and gooseberry nursery stock from the eastern white pine region, to prevent the introduction of the white pine blister disease into the sugar pine forests.

At intervals of 3 to 5 years, middle-aged trees produce a fairly abundant crop of seed, but owing to the large amount of seed eaten by birds, squirrels and other rodents, poor germination and injury to small seedlings by fire, drought, and strong sunlight, there is usually a lack of

native young growth of sugar pine. Planting experiments so far have not been entirely successful. Sugar pine can be grown in Europe and in the eastern United States, but its development is slower and less satisfactory than that of our eastern white pine grown under the same conditions.

COMMERCIAL USES OF SUGAR PINE

THE wood of sugar pine is very similar to that of eastern white pine and has practically the same qualities and uses. The sap wood is white or yellowish white and the heart wood light brown, in some cases tinged with red. Like eastern white pine, one of its most prominent characteristics is that it shrinks, swells and warps but little under varying moisture conditions, is easily worked with tools and is not likely to split when nailed. Smooth and rather fine in texture, it has a beauti-

of the trunks were used and thus thousands of feet of excellent saw timber were left to rot in the woods. The shake maker seldom bought the timber, but cut the sugar pines wherever he chose. At the present time shake making survives only in the remote sections where the portable shingle mill has not found its way, or where dead pines are far from the sawmills and must be utilized in this way to secure part of their value.

Close similarity of the wood to that of the eastern white pine has enabled sugar pine to enter markets which the eastern species can no longer supply. Foreign markets for this lumber have also been developed in recent years.



LOADING CREW AND MICHIGAN WHEELS IN USE IN CALIFORNIA

On land not too steep and rough, sugar pine logs are brought to the railroad by means of big wheels. This photograph shows the stiff-tongue or Michigan logging wheel, delivering a sugar pine log at the landing.

ful light satiny luster when finished. It is resinous and has a pleasing fragrance and does not impart a contaminating flavor to food materials brought into contact with it. It is also fairly durable in contact with the soil.

Sugar pine lumber first came into use shortly after the discovery of gold in California. At first the demand was principally for "shakes" or split shingles which were used not only for roofs but also the sides of cabins. With the need for more pretentious buildings the business of sawing sugar pine lumber developed. Shake making is still practised in California, and, although belonging to a disappearing tribe, the shake maker is as well known and as picturesque a character as the prospector. The average size of a roof shake is 6 inches wide, 32 inches long and one-fourth inch thick. The first requisite in splitting shakes from sugar pine logs is straightness of grain. Many splendid pines, 5 feet or more in diameter, were felled and then discarded by the shake maker because the splitting properties were poor. Of the best trees, only 20 to 50 feet



HUGE SUGAR PINE LOG ON SLIDEWAY

Five and one-half foot sugar pine log going down slideway, Sierra National Forest, California. The log-chute is made of straight logs, 50 or 60 feet long laid in two parallel rows, about 5 inches apart. The inner surfaces are hewed off and greased. If the grade is over 30 per cent and the logs are greased, they slide of their own accord, otherwise, horses or donkey engines pull them to the mill. The chutes from the woods to the sawmill are often 1½ to 2 miles in length.

On the Pacific Coast sugar pine is used in the manufacture of high grade products for which white pine has been the standard in the eastern United States. The latest and most complete information on sugar pine is contained in a recent publication of the Forest Service,* from which the following account is quoted as furnishing the most accurate data:

"With the advent of the sawmill in California, the more accessible stands of sugar pine were eagerly sought by the lumbermen because of the superior quality of the lumber. Its durability, lightness, and softness as compared with other available woods led to its use for shakes,

* Bulletin No. 426, United States Department of Agriculture.

flumes, sluice boxes, bridges, houses, barns, fences, and numerous other purposes. Shingle manufacture has to some extent replaced shake making. The early demand created by the fruit industry for trays and boxes was met largely by the sugar-pine mills. With increased use prices were stimulated, good grades increased in value, and the lower grades were utilized in box making. Because of its



TIMBER FALLERS AT WORK ON A BIG SUGAR PINE IN SISKIYOU COUNTY, CALIFORNIA

The beginning of the end of a sugar pine tree. The "fallers" have cut away the thick bark and undercut the trunk in the direction it is to fall, and they are ready to use the ten-foot cross-cut saw to bring the giant to earth. Additional men are needed to cut the trees into logs. Ordinarily such a crew will cut 35,000 feet to 150,000 feet B.M. of logs in a day, or enough to keep a fair-sized saw-mill busy.

color, lightness, and freedom from taste and odor, sugar pine has remained a favorite with raisin packers. Some mills work a portion of their output into raisin trays, some specialize in raisin boxes, and nearly all utilize their poorer grades for box shooks or dispose of them to box makers. About 65,000,000 feet are used in California in bridge construction, sluicing, dimension stock, and general building material.

"Because of its straightness, softness, freedom from warping and shrinkage, splendid service when exposed to weather, and fine finishing qualities, sugar pine is a very important wood in the manufacture of special order sash, doors, and blinds, decks of boats, and general millwork. These same qualities make it valuable for frames and stairwork. For pattern and model making, which require woods easily worked, glued, and nailed, it is a close second to white pine. Fixture manufacturers use it for altars, beading, show cases, counters, veneer cores, shelving, and drawers. Freedom from taste and odor makes it especially valuable for druggists' drawers, for compartments for spices, coffee, tea, rice, sugar, and other provisions, and for shelving. Furniture manufacturers turn it into backing, built-in dressers, sideboards, carved work, core stock, table frames, and tops. Tanks, hot-grease vats, troughs,

and water boxes, requiring freedom from taste and permanence, are frequently made of this wood. Its lightness recommends its use for special trunks and sample cases. Its straight grain and permanence give it a place in the manufacture of piano and pipe organ keys and actions, and player pianos; and the same qualities, together with lightness, place it among the best woods for drawing boards and extension level rods.

"Large quantities are used by planing mills in the manufacture of cut siding, interior finish, and moldings. It takes readily the finest enamel finish.

"In addition to the above, sugar pine is used for drain-boards, elevator floors, brushes (brush blocks), apiary supplies, machine parts, saddles (saddle trees), shade and map rollers, wood carvings of all kinds, oars, slack cooperage, woodenware, bakers' work boards and troughs, dresser brackets, and small turnings and fencing. A large quantity is made into matches."

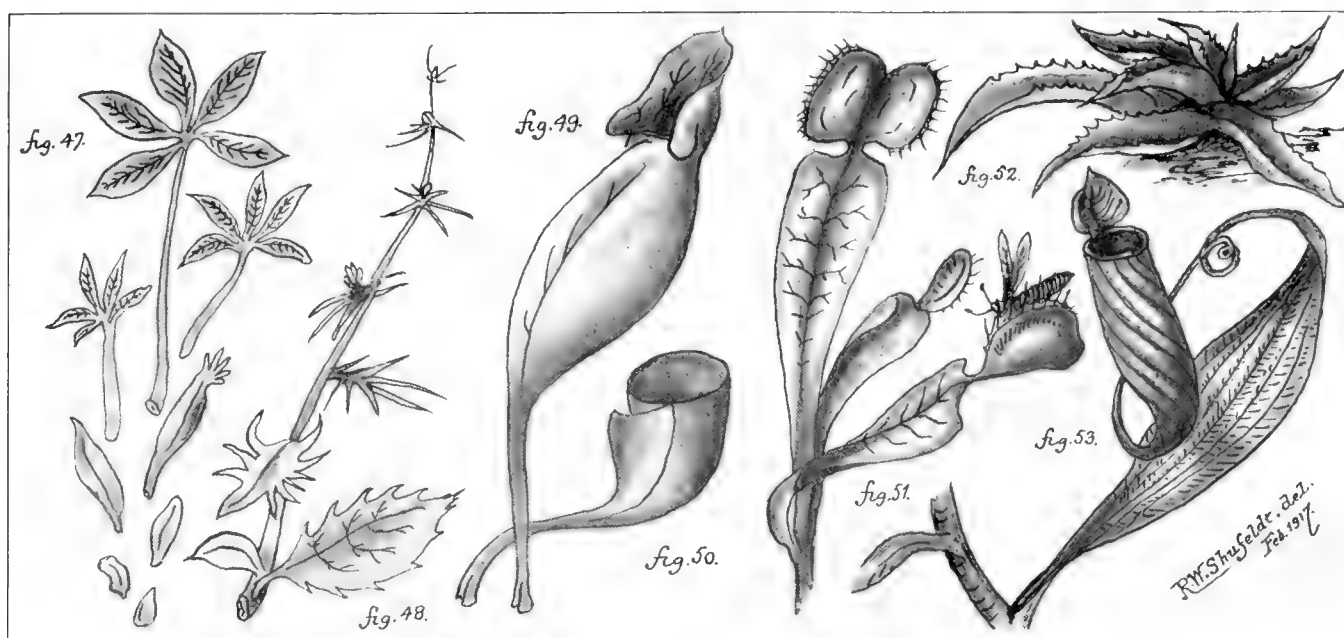
Sugar pine sells for \$1.25 to \$4 per thousand feet B. M. "on the stump," depending on the location of the timber and other factors. The average cost of cutting the logs and transporting them to the sawmill is estimated to be about \$5.50, and the cost of manufacturing amounts to about \$3.50 per thousand feet. The average price of sugar pine lumber at various California sawmills ranged from \$21 to \$24 per thousand feet in 1912.

In logging sugar pine on fairly smooth or level land, the lumbermen sometimes make use of pairs of huge wheels, 10 to 12 feet in diameter. The logs are chained to the axle of the wheels and one end raised above ground. They are then pulled by horses to the log chute, railroad or flume. The usual procedure in logging sugar pine, however, is to employ steam donkey engines or "yarders." Steel cables are run out and the logs pulled in from distances ranging up to 2000 feet. Logging railroads are used to carry the logs to the mills whenever possible and the yarders are located along the railroad.

FORESTRY MEETING AT PITTSBURGH

THE Chamber of Commerce of Pittsburgh, well-known as a progressive and business-like body, with a habit of initiating and carrying through to successful completion movements of value to the public, is arranging for a convention of forestry interests to be held at Pittsburgh in June commencing on Thursday, June 21st and continuing through the 23rd.

Pittsburgh will afford an excellent central meeting place for forestry organizations from the East, South, and Middle West, and cordial invitations are being sent out by the Chamber of Commerce to State Forestry Departments, and to National and State Forestry organizations, to join in the Conference. The meetings for the reading and discussion of papers will be held in the commodious assembly hall of the Chamber of Commerce, and excursions to points of interest in the vicinity are contemplated. Well ordered local arrangements are being made to minister to and promote the comfort and pleasure of those attending, and the proposed gathering is commended to all persons engaged or interested in forestry and its promotion.



THE ILLUSTRATED GLOSSARY—TRANSFORMED OR SPECIAL FORMS OF LEAVES

Figure 47. Leaves are transformed in many ways, as the scales that cover buds may, in developing, become true leaves. One of the best examples of this is the Low Sweet Buckeye of the South, shown in the figure, where the passage from mere bud-scales to a perfect, palmate leaf of five leaflets is shown; or, leaves may pass into spines, a good example of which is furnished by the summer shoot of the Barberry (Fig. 48). As already shown, tendrils are likewise transformed leaves. The Common Pitcher Plant has the leaves modified to form a curious "pitcher" (*Sarracenia*), Fig. 49,—one being seen cut across in Fig. 50. It is also called the Side-saddle Flower, or Huntsman's Cup. Most extra-

ordinary of all is the famous "Venus's Fly-Trap" (*Dionaea muscipula*) found only near Wilmington, N. C. Its leaves are modified to catch flies and other small insects and to digest them. There is a remarkable "pitcher plant" in India (Fig. 53, *Nepenthes*), wherein the leaves contract distally to become a climbing tendril, and at the farther end of this a pitcher, with a true, hinged lid, is developed. This plant is sometimes found in American conservatories. Then, finally, leaves may be so transformed as to become depositories for nourishment for the entire plant, as is the case in the Agave or Century Plant, here shown, much reduced, in Fig. 52 (*A. americana*).

DAISIES, CORN COCKLE, BUGLOSS, AND OTHER SUMMER FLOWERS

BY DR. R. W. SHUFELDT, C. M. Z. S.

THROUGHOUT the central section of the country, even as far as the Pacific Coast region, the month of May is one of the most charming of all the year. Summer has surely come, and the woods and fields, with their thousands of denizens, are thoroughly awake. To be sure, along the Gulf tier of states, it is past or fully into what is midsummer here; while, traveling along the Canadian boundary line, one might meet with snow storms in various localities. Heavy snow storms have been known to occur in Wyoming in August; on the other hand, a member of the Association sent AMERICAN FORESTRY, during the middle of last March, a milkweed from central Florida, just about to bloom, having collected it near Haines City. The birds in that region were then raising their second brood, while in northern Dakota they were hardly ready to begin their nests for the first one. Most young birds, through the central section referred to, are, as a rule, at the stage of the elegant, little Wood Thrush seen in Figure 4; he has only been a day or so out of the nest, and the Ox-eye Daisies, in the southern part of this zone, are already coming out into blossom (Fig. 1), that is, toward the latter part of May. In New England this flower does not begin to blossom much before the first week in June, continuing to do so until the end of August, though stragglers may be seen until pretty late in the autumn.

This common white daisy of ours has been the theme for many, many pens, and its literature extends back into the days of Colonial history of the United States. It is well to know that the plant originally came from Europe, probably introduced by the early colonists. This will account for its still being confounded, in some quarters, with the English daisy—an entirely different plant, with a very different flower.

Besides being called the White Daisy, it has also received the name of Ox-eye Daisy; the White-weed; Marguerite; Love-me, love-me-not; and perhaps other names. It belongs in the genus *Chrysanthemum*, being generally known as *C. leucanthemum* of Linnæus, and there is at least one variety of it (*C. l. pinnatifidum*), a very abundant subspecies in fields and meadows throughout the north-east section of the Union, where it is most heartily detested by all farmers and agriculturists. In addition to this variety, there is the Corn Chrysanthemum (*C. segetum*) and two other species known as the Feverfew (*C. parthenium*) and the Mint Geranium or Costmary (*C. balsamita*), which latter was introduced from Asia. These last species are all garden escapes; they are spreading over the country in many places, and at a pretty rapid rate in some localities. It is hardly necessary to say that the generic term *Chrysanthemum* is from a Greek word meaning *golden flower*, referring to the yellow or orange center of the American daisy.

Mathews gives us a pretty good figure of the Feverfew just referred to, which is a tall, branching species, with small flowers; the plant does not occur south of New Jersey. This terse writer dismisses the common daisy in a few words—all of them true enough—when he says: "The commonest of all common weeds of the fields and wayside, often called Farmer's Curse, yet a prime favorite with children and artists! The flower's form is a *summum bonum* of simplicity and decorative beauty. The orange-yellow disk, depressed in the center, is formed of perfect flowers; the white rays are pistillate. The dark green leaves are ornamentally lobed. 15 25 inches high."

By all odds the best way to study daisies is to get right into a big field of them, such as is here shown in Figure 1. The first thing that will come to mind of many is the old story of Goethe's Marguerite; and, as you ramble among them, you can almost catch the words: "He loves me, he loves me not"—for so said the maiden in

"Faust," as she plucked and let fall, one by one, the snow-white rays of the flower she held in her hand. There is nothing more beautiful in all the world of wild flowers than a big meadow of these very daisies in full bloom; and if the warm sunshine of early summer is added to them, with the rollicking song of the bobolinks thrown in, what have we, among all scenes of the kind, that is more enchanting throughout nature?

If you pull up one of these plants, you will see at once that its stalk is smooth and high, and may be lengthwise grooved. Occasionally you will meet with a branched specimen, but not often. The stalk and leaves are of a rather light green color, the leaves being alternately arranged on the stalk, snugly clasping it below. Sometimes double flowers will be met with, and by flowers is meant the entire affair that caps the upper end of the stalk. This is said for the reason that the true flowers are the minute, yellow, tubular growths that form the depressed, subcircular center, around which are arrayed the white, false "petals" or rays. This central disk becomes conical as the season advances, and a full account of its structure would indeed make quite a chapter. The

cup in which this yellow disk of closely crowded florets is found is made up of a mat of green bracts, closely packed together, all being finely pointed at their free ends. One quaint writer at hand says of the foliage of the white daisy that "its leafage is interesting and individual in gesture."

The white female florets, generally about twenty-five in number, are stamenless, and, beyond their beauty, possess no utility other than to attract insects to the yellow circle of true flowers they surround. "Inside each of these tiny yellow tubes stand the stamens," says Neltje

Blanchan, "literally putting their heads together. As the pistil within the ring of stamens develops and rises through their midst, two little hair-brushes on its tip sweep the pollen from their anthers, as a rounded brush would remove the soot from a lamp chimney. Now the pollen is elevated to a point where any insect crawling over the floret must remove it. The pollen gone, the pistil

now spreads its two arms that were kept tightly closed together while any danger of self-fertilization lasted. Their surfaces become sticky, in that pollen brought from another flower may adhere to them. Notice that the pistils in the white ray florets have no hair-brushes on their tips, because, no stamens being there, there is no pollen to be swept out. Because daisies are among the most conspicuous of flowers, and have facilitated dining their visitors by offering them countless cups of refreshment that may be drained with a minimum loss of time, almost every insect on wings alights on them sooner or later. In short, they run their business on the principle of a coöperative department store. Immense quantities of the most vigorous, because cross-fertilized, seed being set in every patch, small wonder that our fields are white with daisies—a long and merry life to them." What this close student of American flowers says here will apply, with great truth, to a very large number of our *Compositæ*; for, as a matter of fact, it applies to Asters, Sunflowers, and their multitudinous allies and representatives.

Passing to another group, we find an interesting one in the Pink family, which bears the scientific name of



A FIELD OF WHITE OR OX-EYE DAISIES IN MAY

FIG. 1.—Daisies belong to the *Compositæ* or Composite family, one of the largest groups of plants in this country including, as it does, a great variety of species. Among these are the familiar Golden-rods, Asters, Cockleburs, Sunflowers and their numerous allies, Thistles, and many others. The word Daisy finds its origin in "Day's Eye," the flower of Europe (*Bellis perennis*), a pink and white flower that closes in the evening and opens at daylight.

Caryophyllaceæ. According to Gray, this contains some fourteen genera, split into two tribes. Perhaps the best forms in it known to the nature student are the Chick-weeds, Campions, and a few others. In this group there is, however, one very well-known plant, not only to those who go afield to study our wild flowers, but to farmers and to many foresters as well. Reference is made to the Corn Cockle (*Agrostemma githago*), an excellent example of which is shown in Figure 2; this is another plant introduced from Europe. The scentless flowers, which are of



FLOWERS AND SEED-PODS OF CORN COCKLE (*AGROSTEMMA GITHAGO*)

FIG. 2.—This is an annual that was introduced from Europe, and it is a part of the grain fields in this country. The flowers are of a pretty magenta shade and rather showy. The plant is straight, branched, with densely hairy stems. Note the long, linear sepals extending beyond the five petals. Leaves linear, long, opposite, and of a pale green color. The large black fly seen resting on one of the stems is *Cuterebra cuniculi*, so named because its larvæ are bred beneath the skin of rabbits.

a bright crimson-purple color, appear late in May in the South, but not until July or August in the northern States. The example given in Figure 2 presents not only the flowers but also specimens of the seed-pods at various stages of their development. It will be noted that the

flowers are single and terminal on the stems. There is a large calyx, the five linear lobes of which are longer than the five rounded petals of the corolla. There is one pistil and ten stamens, with their five styles. The hairy, pale



BUGLOSS, A HANDSOME WAYSIDE FLOWER (*ECHIAM VULGARE*)

FIG. 3.—We find two plants in the Borage family (*Boraginaceæ*) to which we apply the name of Bugloss; they belong to different genera. There is the Small Bugloss (*Lycopsis arvensis*), and the one shown in this figure, which is Viper's Bugloss, also called Blue-Weed and Blue-Devil (*Echium vulgare*). This is a magnificent specimen collected early in the summer near Washington, D. C., and photographed by the author. This plant is found flourishing along roadsides, railroad-tracks, and in waste meadows, being abundant in some sections of the country and rare in others. It escaped from England, and is common in some parts of Europe and Asia. Bugloss flowers of this species are pink in the bud, come out blue, then turning to a reddish purple. Their form, as well as that of the leaves and stem, is well shown in the picture.

green, linear-lanceolate leaves are opposite, while the stout and erect stem is four-angled, and will be frequently seen to branch.

Corn Cockle plants sometimes occur in many thousands in the grain fields anywhere over their range, which is pretty general; and, while detested by the farmer as noxious weeds, the sight they present to the lover of wild flowers is certainly a beautiful one. They are often met with along roadsides, and it was in such a place that I found the one I photographed for Figure 2.

When the farmer takes in his wheat or other grain, the Corn Cockle seeds often get mixed up with it, which is unfortunate, as it contains a poisonous element known

as saponin. This, when inhaled, will cause one to sneeze most violently; and as the saponin is entirely soluble in water, it has a most deleterious effect when taken into the system, producing a very unpleasant disease which may become chronic. Therefore, ground-up Corn Cockle seed will ruin all kinds of flour of which we make bread. The very mention of the name Corn Cockle will set a miller's teeth on edge, and is likely to call forth some pretty strong language. The plant may grow to be a yard or more high; it is fertilized by certain moths and

or Grass, Snake flower, and Blue-thistle. Authors also give Blue-Devil, Blue-Violet, and so on. It ranges from New England southward, being abundant in some localities, but more than scarce in others, especially as we pro-

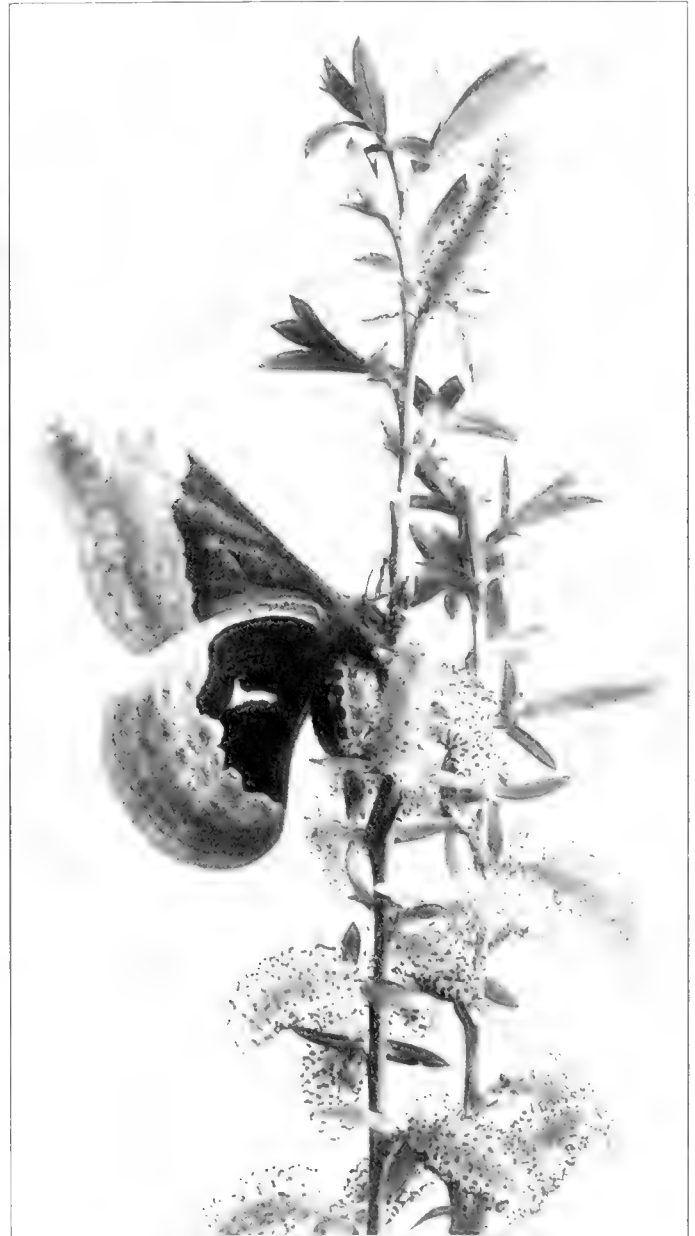


YOUNG OF ONE OF OUR FAVORITE SONGSTERS

FIG. 4.—There are other living things to be found in the woods in May beside flowers, and those frequently in the open will be sure to meet the one when out for the other. Indeed, botanizers cannot go far afield in May, in most sections of the country, without coming across various young birds that hatch out during that month. The one here shown is the young of our favorite thrush, the Wood Thrush (*Hylocichla ustulata*), that grand songster which enlivens the woodlands with his ringing, bell-like notes as the sun nears the horizon during the entire month of May, not to say far into the summer. There are other beautiful thrushes in our avifauna related to the Wood Thrush, while the Robin, Brown Thrasher, and Catbird are near allies.

butterflies, and especially by the night-flying moth *Di-anthaccia*, the larvæ of which subsist upon its unripe seeds.

In the Borage family (*Boraginaceæ*) we have another beautiful plant that was introduced from Europe several centuries ago, strictly speaking, from England, along about 1683, at a time when it was nearly exterminated there. Reference is made to the elegant "weed" generally known as Viper's Bugloss, a splendid specimen of which is here shown in Figure 3. This is the *Echium vulgare* of the botanists, and it receives its name Viper from a writer of ancient history, Dioscorides, who apparently was the first to note the resemblance to a snake's head in the side view of the flower. Since then, many vernacular names have been bestowed upon it, as Blue-Weed, Viper's Herb



FINE EXAMPLE OF A WILLOW IN BLOSSOM

FIG. 5.—The Willow family (*Salicaceæ*) is a very puzzling one to study. There are many varieties and species of them in this country, and they not infrequently hybridize. Most of them flower out quite early, as the one here shown, which exhibits the flowers of the Silky Willow (*Salix sericea*), a large shrub growing in wet places from New Brunswick southward to North Carolina, and westward to Michigan. The side view of the large American moth here shown is a specimen of a female "Spice-bush Silk-moth" (*Callosamia promethea*), which emerged from its cocoon in the writer's study early in the spring. Holland, in his *Moth Book*, says: "Every country boy who lives in the Atlantic States is familiar with the cocoons, which in winter and spring he has found hanging from the twigs of the spice bush, the sassafras, and other trees. As they dangle in the wind they are easily detected, though they are often wrapped in the dead leaf in which the caterpillar originally spun them." (Pp. 84, 85.)

ceed southward. Late in May or early in June we may find it in bloom as far south as southern Maryland. Along railroad tracks are good places to search for it. Alice Lounsberry says: "When growing along the roadsides, its extreme hairiness attracts an immense amount of dust, and not until it has been shaken, or washed off, is the prettiness of the blossoms seen."

Bugloss buds are of a pink color, but the small, scentless flowers, when they open, are of a brilliant blue. They are thickly arranged on one side of the stem, which latter is hairy and ornamented with minute, dark-colored specks. The five-lobed corolla is of a conical form, and from it protrude the red, exerted, five unequal stamens. More-



GOLDEN-KNEE IN FLOWER

FIG. 6.—We have here a typical flower of the month of May, known as the Golden-Knee (*Chrysogonum virginianum*), a representative of the great Compositæ family (*Compositæ*). It is found only from southern Pennsylvania to Florida, and this is probably the first published photograph of it, the specimen having been collected at Great Falls, Maryland. Gray's specimen was found at "High Island at the Falls of the Potomac." It is a low-growing plant, rarely attaining a height of a foot and a half, generally less. It is a very striking flower in the woods on account of its brilliant orange, five-petalled involucre, which is silky and fluted.

over, we may note by the aid of our hand-lens that there are but two styles and one pistil, while the calyx is five parted. The lanceolate leaves are alternate, hairy, and of a rather light green. Bugloss may grow to be over two feet in height—indeed, I have seen some plants fully a yard high. Gray describes the plant as a "rough bristly biennial," the "nutlets roughened or wrinkled, fixed by a flat base." The fertilization of this plant is an interesting story, but too long to recite here; it may be said, however, that, through its evolution, Bugloss has entirely lost the power of fertilizing itself.

Coming back to the *Compositæ* for a moment, it is quite surprising how our descriptive botanists will sometimes omit a plant, which in some localities is more than abundant. A good example of this is seen in our Golden-Knee (*Chrysogonum virginianum*), which has been overlooked in all the books on flowers at hand, save in Gray's

last *Manual*. Why it should be called Golden-Knee is hard to say; and, as a matter of fact, the term is a mere translation of the two Greek words composing its generic name. In early May it is a very common flower along the Potomac river, in Virginia as well as in Maryland and in some sections of the District of Columbia. Even Gray cites it as occurring on "High Island at the Falls of the Potomac" (p. 826), but here he especially refers to a variety of it named by him *C. v. dentatum*. This variety is said to have acute leaves that are of a deltoid-ovate form, and coarsely toothed along their margins. As a rule the leaves are as we see them in Figure 6,—that is, ovate for the most part, and very rarely cordate. One cannot miss recognizing this beautiful plant when it is in flower in the woods; its brilliant yellow blossoms and hairy stems will go a long ways towards this; and when we note the long peduncles to the flowers, and the long-petioled leaves—the petioles being hairy as in the case of the stems—we may be pretty certain that a Golden-Knee is the plant before us. As with so many other *Compositæ*, the true flowers, of which there are a great many, make up the center of the blossom, the five yellow rays (not petals) being pistillate and fertile. This perennial herb presents not a few other diagnostic characters; but, in view of what has just been given, it will not be necessary to enumerate them at this time. *Chrysogonum* rarely attains a height to exceed fourteen or fifteen inches, the average plant being about a foot high.

THE FORESTRY GUY

By Arthur Chapman

A knightly figure amid the green,
In khaki instead of mail,
A face of bronze, eyes quick and keen—
Swift hoofbeats on the trail;
A home in the saddle through summer days,
A bed 'neath the evening sky;
Who is it that travels the silent ways?
He's only a forestry guy.

A camp on the heights, where snowbanks gleam;
A pack-horse that's grazing near;
No sound save the sound of the mountain stream—
The town sends no echo here;
A figure bathed in the sunset's fires;
Who dwells on these peaks so high?
Who travels amid these granite spires?
He's only a forestry guy.

A tendril of smoke in the valley wide,
A flame that is fanned by the breeze;
A break-neck dash down the mountain side
And a fight for the living trees;
A fight that is won, though the price is dear;
There are scars ere the red flames die;
Who is it that dices with death each year?
He's only a forestry guy.
—From the April edition of "The Teepee Book."

FORESTRY FOR BOYS AND GIRLS

BY BRISTOW ADAMS

SOME FOREST HISTORY



THE gorge is roaring to-night, and I can hear it plainly as I sit writing, even though the windows are closed. While it is spring, there is still a chill in the air and frosts are yet common.

But the days are fine so that we can all walk abroad and seek out the first spring flowers. When we were out today we could smell the scent of new earth almost as if we were following the plow; yet there was no earth turned, and we noted that the odor came from the gorge itself, as the water carried down the flood that came from the thawing ground. The spray from the falls tainted the air with the good earthy smell, but I was sorry to know that all that good earth was going to waste. The falls made a grand sight with so much water going over them, but were not lace-like and white as they are in summer. As Everett said, they looked "like a great flood of chocolate with whipped cream."

The water that trickles down the sides of the gorge, where it is too steep to have farm land, is crystal clear as it flows from the mosses, ferns, Canada yew, and other undergrowth. The hemlocks, pines, ash trees, chestnuts, oaks, maples, and hickories find a foothold wherever they can, and cling along the ledges. From a distance the gorge is a dark blue-gray in winter, and a strip of deep green in the summer, where the bordering trees stand out in the midst of the upland fields on either side. As we walked, we talked, and I made a guess that when the Indians lived here the water did not come down in such floods and did not get so muddy.

AT ONCE the boys were filled with questionings: "Did the Indians ever really live here? How could they keep the water from being muddy? What kind of Indians were they? Did they have bow'n'arrows?" And there were about twenty more, all in a breath!

"Hold on a minute," said I, "this is history you are getting into, and Gertrude hates history."



"I should say I do," replied Gertrude, "nothing but dates, and names of old-time ginks, and fights!"

Somehow, I could not quite disagree with the younger girl, because I had seen her trying to learn some of these same names and dates. As for myself, there is only one date that I am sure of in American history, and that is the landing of the Pilgrims in 1620. The reason I know that is because I had to stay in after school, when I was nine years old, and write "The Pilgrims landed in 1620" five hundred times before I could go out into just such a fine spring day as this has been. But I remember those Pilgrims and the time they landed to this very day.

Gertrude's mind was diverted from history in a moment, and she came down to present-day facts all of a sudden. "You ought not to fuss at us for getting kept in after school," said she, "because you did it your own self."

Everett came to the rescue with further questions about the Indians, and about what they had to do with the clearness of the water; so I was glad to try to satisfy his curiosity in some such way as this:

WHEN those Pilgrim Fathers landed, there were not so very many people in this country, and these were the Indians. They did not have large farms or cities as we have. They had villages, and in the level spaces, like the low land near the head of the lake, they grew some corn and tobacco, and a few other crops. All the rest was forest, where



they hunted, and through which they had trails from village to village, and from one lake or stream to another.

ALL around the little settlements made by those who first came to this country were these giant forests, and in the forests were Indians, bears, panthers, wolves, and wildcats. Is it any wonder that the settlers cut down the trees around their houses, to clear land for growing crops, and to make open spaces across which the Indians and the beasts could not pass without being seen, so there would be warning if they came as enemies? The forest supplied them with wood for building their houses and their forts, and with fuel to keep them warm and to cook their food. But there were too many trees, so the thing to do was to cut them down. The woods stretched away to the west, almost unbroken from the Atlantic to the Mississippi; then came the great prairies which were treeless then as now, and beyond them the forests of the Rocky Mountains and of the Pacific slope.

These were the largest and most useful forests in the world, and they covered between eight million and nine million acres. You do not know how big a space that is, and I do not know just how to explain it to you; but the main thing is that we have something more than half that many acres still left in forest. Yet it is not the forest that it used to be, and while we have more than half of the land still covered with trees that was covered by the first forests, they have been so cut and burned that there is much less than half of the timber standing than there was then. In other words, we have a lot of waste land now that is not growing either trees or crops, but only scrub stuff.


AT this point Everett broke in to ask again what all this had to do with the Indians. So I told him that the country all around us had once belonged to the Iroquois Indians, who were a very brave and fine lot of people. They had their corn fields in the valley below where our house stands, but all the hill country was in deep woods, where they could hunt bear and deer. The very beautiful valley

to the southeast of us, that we know now as Pony Hollow, was the vale where the Saponis lived, another Indian tribe; but most of us have forgotten all about them and even their name has been changed to "Pony" because we are used to that word.

Rabbits, squirrels, wild turkeys, and all sorts of small animals and birds, as well as the larger ones, furnished them with food, and there were many fine berries. We can still find the arrow heads, large or small, depending on the game to be brought down, and we can still find mounds which marked their villages. Some of these mounds are remarkable, and one that I have seen on the campus of the University of Wisconsin is a clear representation of a bird in flight, with wings outstretched.

Mr. Harry Knight, one of our neighbors, has worked out the Indian method of making arrow heads, and finds that they did not chip the flints with other stones, nor with cold water suddenly dashed on stones which had been heated in the fire. He can make flint arrowheads that can not be told from the ones the Indians made three hundred years ago, and he does it by flaking off the flint with a piece of bone or even a piece of wood. He says he is sure that this is the way the Indians made them, because it is the only way that he can get the same kind of a chip that shows on the original arrowheads; more than that, no one has ever found any tool for arrowhead-making, and this seems to prove that the tool must have been of wood or bone, or some substance that would decay with time.

The children got so interested in the question of arrowheads that I thought they would forget about the clear water; but Everett called us back to it, and I explained that the bare upland fields and the gullied roads were all covered with trees at the time the Indians were here, and that the water flowed clearly from them, just as it does from the oozy places in the sides of the gorge. Most of these steep hillsides ought to be in woods now, and the woods should be fully stocked with healthy trees, instead of being scrubby and fit for little but firewood, and a poor grade of firewood at that.



COMMUNITY SPIRIT SAVED THE TREES

BY GAYNE T. K. NORTON

AT first glance an intimate connection between trees, subway construction, community spirit and the bettering of unpleasant conditions in everyday life does not appear; yet, because of a few elms and a bit of subway construction, the people of Brooklyn did themselves a tremendous favor. They proved the existence of community spirit in the borough—absolutely the one thing New York needs most.

They demanded a change in subway construction to save the trees and expected to pay some \$500,000 for it. After legal battles and the loss of a few trees their demands were granted, and, instead of adding a half million dollars to the construction costs, that amount was saved as a result. The economic importance of trees has long been

recognized, but in this instance every one of the elms saved is worth more than its weight in gold, for they have become living monuments, testifying to the power of community spirit. The very fact that they remain standing should furnish incentive to Brooklynites, and others, to attack and rid the community of many social problems. Here is the story of the elms and the all-important lesson they are preaching:

The present subway system is to be continued along Eastern Parkway under ground to finally become an elevated line in the neighborhood of Buffalo avenue. The original plans called for a 4-track system. Brooklyn wanted the subway badly, but when the people learned its building was to cost more than a thousand veteran



Official Public Service Commission Photograph.

HOW BROOKLYN SAVED ITS NOBLE ELMS

Community spirit in the Borough of Brooklyn, New York City, saved these elms, some eight hundred in all, from destruction by subway contractors.

elms and the beauty of the Parkway, besides the millions of dollars, they objected, and determined to save the trees and beauty—and they did.

Petitions were signed, street corner meetings were held, and in other ways the people showed how they felt and what they wanted. It was a long fight; there were hearings galore, and it continued until the work began. By this time Park Commissioner Ingersoll had a new set of plans ready to submit to the Public Service Commission. The people kept pounding hard and the new plans were adopted, though the destruction continued until they went into effect.

The contracts now call for double-decked track construction. The work is being pushed from an open cut, and men from the Park department are on guard, making sure that only the trees specified are taken out. Because of the new contracts more than 800 trees are saved, as

well as a half million dollars in construction. Comparatively few have been cut, but the stations doomed a number. The contractors are required to replace all taken out. All the trees have been inspected and arranged in three classes: those that must be saved; those that should be saved, and those that must go. In some places novel engineering tactics were used in "shoring up" the roots exposed by the excavation.

At first the contractors looked askance at this idea of changing approved plans to save trees; they thought it would mean added trouble and expense, but when they felt the force of the public will, objections were no longer offered. The change proved to be an advantage and saving, and their present attitude may be judged by the action of the Intercontinental Construction Company, which was given permission to cut 145 trees and found it necessary to cut only 100.

AN EPOCH-MAKING CONFERENCE

BY HERMAN H. CHAPMAN

ON April 11, 12 and 13, at New Orleans, Louisiana, there was held a meeting, termed the Cut-over Land Conference of the South, under the auspices of the Southern Pine Association, of New Orleans, and the Southern Settlement and Development Association of Baltimore. The sessions, which lasted for three days, were remarkable for the representative character and earnestness of the delegates in attendance and the number of notable men on the program, and the character of the papers and talks.

The addresses might be classed in three groups: patriotic, scientific, and practical. Honorable Carl Vrooman, Assistant Secretary of Agriculture, struck the keynote in his talk on "Agriculture from a National Standpoint." He vividly impressed upon his hearers the vital importance of food production in the present world crisis. On the South, in particular, rests a great responsibility. At present, over \$700,000,000 of food products are imported into this region from other states. This year the South must feed herself and in this way release an equivalent amount of food to supply our allies in the struggle. Mr. Vrooman emphasized the need for a careful classification of the cut-over lands into those suitable for agriculture, and those best fitted for the production of timber crops.

Patriotism found a silver-tongued exponent in Governor Charles S. Brough, of Arkansas. Southern oratory deserves its reputation if it even approaches the standard set by this able representative of the new South. The governor cited the Book of Revelation, in a prophecy of the great part America was to play in the future. "And a woman shall go forth into the wilderness,—and on a barren rock shall bring forth a child,—and this child shall rule the world." His interpretation of this prophecy—that on Plymouth Rock, in the New England wilderness, the child, America, was born, destined to lead the world in the establishment of free government,—was a thought worth more than passing notice.

The convention then took up the second phase,—a scientific discussion of the possibilities of cut-over lands. The fundamental question, that of the soils and their characteristics, was most ably treated by Mr. C. F. Marbut, of the Bureau of Soils, Department of Agriculture. The speaker dealt only with the so-called "coastal plains" soils, omitting the alluvial lands of the Mississippi Valley. Only the portions not already developed as farms were included—and in this part of the South—for the States of Texas, Arkansas, Louisiana, Mississippi and Alabama, the undeveloped land occupies from two to three times the area of farms under cultivation. These unimproved areas Mr. Marbut divided into four classes of soil—sandy loam, constituting the best type of land for permanent agriculture; wet and heavy land, suitable more largely for grazing; sandy land, on which truck crops and cotton can be raised, and rough or broken land, unsuitable for agriculture, on which forests should be the permanent crop. The areas in each of these classifications are roughly 25 per cent. The total cut-over area, as brought out by other speakers, is now 76,000,000 acres, and will in time amount to 250,000,000 acres. On the basis of this classification, there probably exists from 40,000,000 to 50,000,000 acres of permanent forest land in the Southern states. A great deal of attention was devoted to the livestock industry, and the grazing problem. In discussing this question, the convention had the testimony not only of such experts as Dr. C. V. Piper, Chief Agrostologist of the Bureau of Plant Industry, Mr. George M. Rommel, Chief of the Animal Husbandry Division of the Department of Agriculture, but of several experts connected with the state agricultural departments, and the testimony of a number of owners of cut-over lands who had experimented with livestock. No attempt was made to introduce any of the exaggerated advertising common to the booster and land-speculator, but the speakers talked facts, and the audience got down

to the bed rock of actual experience. It was brought out that the grazing on cut-over pine lands required from seven to ten acres to support a cow through the season, and that a feeding period of three months was necessary. Cattle turned out to rustle through the winter, after frost had killed the grasses, frequently starved to death, and at best made very slow growth. The South demands a new standard of management for success in cattle feeding and this new era will be ushered in by the use of the silo and winter forage crops. The estimates of value placed on grazing were from 15 to 25 cents per acre.

The experience talks, by owners of cut-over lands, formed the third great feature of this conference. The most typical and enlightening of these was an impromptu narrative by Mr. Alex K. Sessoms, President of the South Georgia Land Owners' Association, representing about 2,000,000 acres of land. Finding himself in possession, by inheritance, of some 70,000 acres of sandy land in South Georgia, Mr. Sessoms told how he had discovered that the neglected second-growth (Cuban or slash) pine was capable of yielding a revenue from turpentine, which, under a proper system of management, will yield a perpetual income, sufficient to pay all the expense of taxation and maintenance, and furnish a large surplus for the agricultural development of the remainder. By deep plowing and proper use of fertilizers, the portion brought under cultivation has been made very productive. As a result, not only has he demonstrated to his neighbors that land considered by them as worthless can be farmed, but he has solved the problem of carrying charges, and no longer desires to sell his land in order to get rid of a piece of unprofitable property.

In thus demonstrating on a large scale the possibility of forest crops as a source of permanent revenue, and the fundamental economic solution of the problem of carrying cut-over lands, Mr. Sessoms has done far more for the South than he realizes. The enormous possibilities of the slash pine second growth on the belt of flat, sandy soils bordering the Gulf is not yet appreciated. And in the use of the revenue from this source to develop other portions of his land for crop production, we have a wonderful example of the proper economic relation between agriculture and forestry in this region.

But by far the most hopeful and inspiring phenomenon of this truly remarkable gathering was the candor and honesty with which those southern land owners, mostly lumbermen, discussed the problem of land values and colonization. Not once or twice, but many times, in each of the three days' sessions it was clearly brought out that the settlement and subjugation of these cut-over lands was a difficult and fairly expensive process, and that the owner of these lands was morally bound to see that the purchaser and immigrant succeeded in making a living. Many speakers pointed out the great harm that had been done in every Southern state by the operations of irresponsible land speculators, or unscrupulous land owners, whose only thought was to obtain as high a price as possible for the lands, even though it left the purchaser without capital for their development. It was shown that the cost of clearing, fencing and improvements, and the poverty

and rawness of the soil, requiring two years or more to bring to a condition of profitable production, prevented the actual economic value of these raw lands from reaching a figure much in excess of \$5 per acre. The great injury done to the purchaser, and through him, to the South as a whole, was most clearly and vigorously set forth by such men as Dr. Bradford Knapp, Chief of the Office of Extension Work, States Relations Service, United States Department of Agriculture. Dr. Knapp denounced the process of selling these cut-over lands at high prices to persons unfamiliar with Southern conditions as highway robbery; and he claimed that the advertisements of certain land-selling agencies should be barred from the mails. It is significant that these statements were greeted by prolonged applause from the owners of these millions of acres of cut-over land who composed his audience.

The comparative absence from the deliberations of the convention of participation by the type of professional booster, whose extravagant and optimistic literature is so familiar to the would-be purchaser of lands, was a noticeable feature of the gathering. Representatives of land-selling and colonizing agencies were in attendance and one or two determined efforts were made to stampede the convention into some form of action which would furnish these agencies with advertising capital to be used in booming cut-over lands. But this element never at any time controlled the proceedings or swayed the convention from its purpose, which was to find out the facts, and to map out a plan of organization and policy which sought, not the temporary benefit of the land owner at the cost of misinformed purchasers, but, the permanent upbuilding of stable communities of farmers on such of these lands as have agricultural value.

This convention marks a new era in the economic thought not only of the South but of the entire country,—and in this movement the South bids fair, under the guidance of such men as attended this convention, to take the leadership. This thought was summed up by General L. C. Boyle, of Kansas City, who said: "Not a man to-day has been talking about how much money can be made from a sale of these lands, but of how to help the little fellow. This conference is giving evidence of the right spirit—the unselfish spirit of a vision—the spirit of coöperation. Government coöperation with the people is the order of the day. The men who have the vision, the understanding and the spirit, whether state or national experts, or private land owners, are bound to succeed. The highest patriotism is to make the land habitable for the poor and needy."

A permanent committee of ten men, two from each of the five states represented, was appointed, to perfect plans for permanent organization.

It is worthy of note that a paper prepared by Mr. Henry S. Graves, Chief of the National Forest Service, outlining the possibilities of utilizing much of this cut-over land for second-growth forestry, received close attention, and that the convention adopted a resolution looking to the adoption of plans by which a comprehensive scheme of reforestation may be undertaken, if found practicable.

SOUTH AMERICAN FOREST RESOURCES

A COURSE in Tropical Forestry has been established at the Yale School of Forestry to train men to properly develop the forest resources of tropical countries. There are at least two very large forest regions in the tropics, the Amazon River basin in South America and the Indo-Malay region of Southeastern Asia and adjacent islands. The recent expansion of trade with these regions has focused attention on their forest resources and has shown the urgent need for their proper economic development. This will be greatly aided by the avoidance of the mistakes made in handling the forest resources of temperate regions, which can be done only by the adoption of a suitable forest policy during the early stages of exploitation. What is needed is a public appreciation of the value of the undeveloped resources and of the possibility of making them a permanent asset. This can be brought about by expert foresters, who will not only direct operations in the woods, but also arouse the public to the need of forest conservation, and assist in formulating a proper forest policy, and in the enactment and enforcement of suitable legislation. In India and in the Philippines forest schools have been established to train men for the forest service of those countries. Very little has been done along this line for tropical America, however, so the Yale school's instruction and investigative work will be focused largely on the Amazon country.

A brief review of forest conditions in South America is necessary for a proper appreciation of the problem and

possibilities. The history of every country in the process of development shows that excessive waste accompanies the exploitation of its natural resources. Primitive people of the tropics, by cutting and burning the virgin forest areas to practice a shifting system of agriculture, have been in the past the greatest enemies of tropical forests. The virgin forest areas of the countries of Central America and the West Indies have either been completely destroyed or badly damaged in that way. South America has suffered to a greater or less extent too.

The South American forests, which are of broad-leaved hardwoods, with the exception of two small areas, have been roughly classified under four headings: dry forests, temperate forests, swamp forests, and tropical

rain forests, according to the climatic conditions prevailing in the area occupied by each. The dry forests occur in the temperate or sub-tropical regions, both at high and low levels, over immense areas where the rainfall is deficient or so unevenly distributed throughout the year as to cause long periods of drouth. The tree growth, at its best, is a dense forest of comparatively few species. The trees are short-boled, usually not exceeding fifty feet in height and in many regions averaging little more than twenty-five feet. The commercial stem varies from ten to twenty feet, with diameters of twelve to twenty-four inches common. Perhaps the best known representatives of this type are the Quebracho-Algarroba forests of Northern Argentin-



A "BUTTRESSED" TREE ON THE BANKS OF THE AMAZON

While it is known that the forests of Brazil are rich in valuable hardwoods, they are so vast in extent and the flora so slightly known that botanical investigation will have free scope in this practically unlimited field for many years to come.

tina. They occupy the great semi-arid plain lying between the foothills of the Andes and the Parana and Paraguay Rivers and known as the Great Chaco. Other representatives of the type are the Catinga forests of Brazil and the Coast forests of Colombia and Venezuela between Cartagena and the Island of Trinidad.

The temperate forests are found along the slopes of the Andes where elevation and moisture, combined with suitable soils, make the growth of a temperate forest possible. This type is best developed in Patagonia and comes practically to sea level in Tierra del Fuego. These forests are of Antarctic beech with a few conifers intermixed. Three species of beech would probably furnish ninety per cent of the cut. Although heavy stands are reported in the Patagonian Lake region, the forests are over-mature and so defective as to be of little commercial value. The trees reach heights of one hundred to one hundred twenty-five feet and are two to five

feet in diameter. The extension of this type along the Andes from Chili to Colombia can only be estimated. The great populations that have for thousands of years occupied this region drew on these forests for fuel and construction timber and only second-growth or scattered patches remain.

The swamp forests are made up of the typical mangrove area of tidal swamps and the forests of the fresh-water swamp and bottom lands. The mangrove areas are

limited in extent and have been partially destroyed, but the fresh-water forests occupy large areas and promise to be of commercial importance in the near future. They are irregular in age, often very open and growth is extremely rapid. The species common in this type are in the main soft-wooded, as soft or softer than our own cottonwood, bass-

wood, or yellow poplar, and many with but little color. They reach heights of over one hundred feet in the best soils; probably sixty to seventy feet is the average, with diameters of two to three feet common. Certain of these species reach this height in ten to fifteen years and commercial diameters in much the same time. The dominant stand of any given region is generally made up of a very few species. In many cases four or five varieties will furnish seventy-five per cent or more of the commercial timber and will yield eight to ten thousand feet to the acre.

These three types of forest cover the greater part of the continent

only the northern half of Brazil with small portions of Colombia, Peru, and Bolivia being in the tropical rain forests. Although there are heavy stands of timber in these three immense areas, the supply has been partially exhausted, is too soft for commercial needs, or is overmature, with the result that the limit of consumption is visible. Most of them are in a condition similar to that of the forests of North America and Europe, although not so badly depleted by ruthless exploitation.



VIEW NEAR USHUAIA, ARGENTINA

The temperate forests of South America extend down into what was once generally known as Patagonia and come practically to sea level in Tierra del Fuego. Here in the far south the trees are rather stunted and deformed by the winds, but in the mountains to the north and along the shore of the Patagonian lakes, they reach a splendid development and heavy stands are reported. These forests are of Antarctic beech and a few conifers.

There are constantly growing fears that if the present methods of cutting quebracho forests are not modified and measures adopted for their regrowth, there will be little left of them in a very short time. The same is true of greenheart and mahogany, of Spanish cedar and Parana pine, and of other valuable species. Chili produces several varieties of oak of high quality, as well as valuable conifers, but the area is too small to be considered when looking for a timber supply to meet the demands of the world market.

The Amazon basin, which embraces the territory occupied by the tropical rain forests, is contrasted rather sharply with the other timbered areas of the continent, however. While their product may not be able to meet even the local demand, the tropical rain forest areas stand practically untouched by ax or other instrument of destruction. Until recent years, when medical science robbed this tropical wilderness of its most deadly weapons, man has been forced to avoid it. Now, with his newly-gained advantage, he can work his will there and the wealth



A SAMPLE OF MAHOGANY CUT AT THE SAN PABLO PLANTATION, MEXICO

There are three principal varieties of mahogany trees: the Central American, or true mahogany (*Swietenia mahogani*); the African mahogany (*Khaya senegalensis*), and the Indian mahogany (*Soyimida febrifuga*). The true mahogany grows in Cuba, Florida Keys, Dominican Republic and Haiti, various islands of the West Indies, Mexico, Central America, and to some extent in Peru and Ecuador.

stored for centuries in the most beautiful and most wonderful forests in the world becomes available for use.

Here are a few facts with regard to the forests of the Amazon basin which show how well able this vast area is to replenish the world's dwindling supply of lumber. One million six hundred thousand square miles of densely wooded land make this the largest forest area in the world. It is three times larger than the forested area of the United States and exceeds by two hundred and sixty thousand square miles that of European and Asiatic Russia combined. The stands run from ten to twenty thousand board feet to the acre and are made up of species practically like those now in use and in most cases better adapted to the uses to which they will be put than those

supplied by the forests of North America. The woods are, in the main, soft or of medium hardness, and are suitable to replace pine for construction, oak for finish and furniture, hickory for wheels and handles, and ash for agricultural implements. From the standpoint of the lum-



THE LINGUE TREE

The Lingue tree (*Persea lingue* Nees) is a species of laurel tree which grows between 32° and 41° S. latitude. It is large and its bark is extensively used in tanning hides in Valdivia and neighboring regions. Its wood is very durable, resists decay from water, is beautifully grained and varies from a light yellow to red in color. It is used in making high grade furniture and other cabinet work.

berman, these forests are ideal. The land is level and is crossed by numerous streams, making short hauls to floatable water the rule. Commercial diameters run between two and three feet and clear lengths fifty feet or more. The total height of an average tree is well over one hundred feet. The rapid growth rate of these trees makes the value of the temperate forest shrink into insignificance when compared with the producing power of an equal area of tropical forest. For every dollar of wealth produced by a temperate forest, the tropical forest should yield not less than ten. It is possible to plant and harvest not one but many forest crops in a lifetime with a higher return per acre for each than the single crop of the forester in Europe or the United States. The climate brings forestry nearer to the level of an agricultural crop than anywhere else. Firewood can be grown in from three to five years; pulpwood, posts, and piles in ten to fifteen; and merchantable timber in fifteen to twenty-five years.

It has long been the popular conception that tropical forests are only capable of producing woods chiefly valu-

able for cabinet purposes, for dyes and extracts, and for special uses requiring extreme hardness and durability. Crude and costly methods of lumbering have been responsible for the misconception. Under the existing conditions only those woods which met no competition in the market could be handled at a profit. Thorough investigations,



LOGGING IN ECUADOR

It is estimated that the forest area of Ecuador embraces about 376,050 square kilometers, of which 241,662 are of tropical hardwoods; 84,878 square kilometers of subtropical hardwoods; and 49,510 square kilometers of mahogany forests. There is practically no importation of foreign timber into Ecuador, owing to the heavy protection of the home industry. Guayaquil was once famous as a ship-building center and exporter of lumber, and efforts are being made by the Government to revive the lumber industry and to develop the splendid resources of the country's forestal wealth.

which have been made recently, conclusively show that modern methods of logging will reverse that unusual condition and woods which it has been cheaper to import from countries thousands of miles away will be replaced by native woods of superior quality and at a cheaper price.

The world needs vast quantities of wood, and no spot on the earth with abundant forest wealth is too remote to prevent a profitable harvesting of the timber crops. Quantity of the product, coupled with size and quality, are the only factors determining or limiting the degree of utilization. With the Amazon basin to draw on, South America has the wonderful opportunity of becoming the center of the world's lumber industry. If the various governments will organize forest services and train their young men as foresters, the wealth of this region will flow into their treasuries. South America's future and many of the great problems of forest administration in Europe and North America depend on how this forest is treated. If it is destroyed, as the forests of Argentina, Paraguay, and southern Brazil are being destroyed, it will mean economic ruin, probably also absolute physical ruin, to land, climate, property, and life on a great part of the southern continent. If, on the other hand, it is protected and properly utilized, South America becomes the center of the world's prosperity in the years to come. The saving of this forest also

means that Europe and North America will have time to repair their damaged forests, to perfect their organization, so as to meet the demands without destroying the capital. Only by obtaining great supplies from these virgin forests of South America can this crucial time in the great struggle for forest conservation be safely passed.

The Yale Forest School is doing the world a service in establishing courses that will make it possible for students from foreign countries to get an education in the kind of forestry they will be called upon to practice. Upon graduation such men can return to their own countries and be the leaders in the forestry movement there. They can carry on propaganda work that will aid in educating the public to the need of a strong forest conservation policy. They will be equipped to organize forestry departments to



THE JEQUITIBA TREE OF BRAZIL

This magnificent giant of the Brazilian forests, known as the jequitiba branco (*Couratari speciosa*), often attains a diameter of 5 to 7 meters and a height of over 30 meters. It is said that instances are known where the trunk of a single tree produced more than 8 metric tons of wood. The wood, which is of whitish color, is soft and very light, and is extensively used in making boxes, cases and crates, and as a substitute for pine.

carry out the policy when adopted. They will urge the establishment of forest schools in connection with the government or universities so that, as the forestry movement grows, the country will be in a position to train its own foresters. They will be trained to do investigative work. The courses in lumbering will acquaint them with the modern methods which must be applied. In short, they will be equipped to establish the forests on the ideal basis—one of permanent, maximum yield.

[EDITOR'S NOTE.—Most of the information and many complete statements in this article are taken from articles by Dr. H. N. Whitford, Assistant Professor of Tropical Forestry at Yale University, Mr. H. M. Curran, Special Lecturer on South American Forests at Yale, and Mr. Raphael Zon, Chief of Forest Investigations of the United States Forest Service, and the photographs are from the Pan American Union.

HARMONIZING LUMBERING AND ESTHETICS

BY C. M. GRANGER

A GREAT many lovers of the outdoors feel that Nature's forests should be left undisturbed by the ax to furnish a constant source of delight by their very wildness. The Forest Service receives many requests to preserve from cutting National Forest timber near some mountain summer retreat or along some travelled highway. Occasionally the petition comes from some old resident who has lived with his little patch of trees so long that he actually knows the majority of them as friends and would sorely miss one single individual from the grove. Only a short time ago a request was received from the Rotary Club of Pueblo, Colorado, that the timber along a projected automobile road through the Greenhorn Mountains, which constitute Pueblo's outdoor playground, be withheld from sale and cutting to preserve the scenic attractions of the region.

On the other side of this question we naturally find the lumberman, who believes, as a general rule, that all the timber which is big enough for sawlogs should be cut. In many cases he is compelled to strip his own land because the excessive taxes and interest charges make it financially ruinous for him to delay cutting or to leave the immature trees to be cut later. As a result, countless areas have been stripped of their timber, leaving nothing but a mass of tops and branches and a few scattered trees too small or worthless for cutting. Many times fires have run through these slashings, completing the devastation; but whether fire comes or not the cut-over land presents a most unsightly appearance. The ideal condition in forest management is use without abuse, safeguarding the esthetic values while utilizing the mature timber crop, and this is common ground on which both the preservationist and the lumberman can stand.

The National Forests, including virtually all of the

mountain areas of the West, contain all manner of wonderful scenery—rock, water, and trees in every conceivable combination. Because the Government sells the ripe timber on the Forests, the fear has been entertained that the wild beauty of the forests will in time be changed through removal of the timber. Let us see what a closer view of the situation reveals.



STAND AFTER A CUTTING

One-third of the timber on this area has been cut under a National Forest timber sale, and there remains a thrifty stand all the better in health and appearance for the cutting of the mature and decadent trees.

The timber bodies on the National Forests may be divided into commercial and non-commercial stands. The former are made up of trees of value for manufacture into lumber and other wood products and so located that they may be profitably logged. The non-commercial stands, on the other hand, are those which, either by reason of the quality of the timber or its inaccessible location, are not suitable for lumbering. The timber stand or individual tree has its greatest scenic value when combined with other natural features of picturesque character—deep canyons with rocky walls, high, rocky cliffs, mountain lakes, and the like. In such locations logging is usually out of the question because of the rough, rocky ground, or because the timber is not dense enough or of proper quality to make lumbering pay. Here, then, at any rate, the forest primeval will reign undisturbed by man to create its scenic and esthetic values in Nature's own way.

There are countless areas of these non-commercial forests in every National Forest, both mixed with the commercial timber stands and in the higher rougher portions of the mountains. Those bodies of timber just below upper timber line are the most conspicuous examples—in which many of the trees, because of exposure to severe storms and cold, become possessed of queer, twisted forms, or grow only into dwarf trees of an unusually picturesque character. Due to the location of such timber bodies at the very heads of the streams, they

have a most important function in protecting and regulating streamflow; and because of this and the fact that cutting is impracticable on account of the quality of the timber, such forests are termed "protection forests" and are held intact. Taking Colorado as an example, almost one-fifth of the timbered area in the National Forests



NO SIGN OF CUTTING HERE

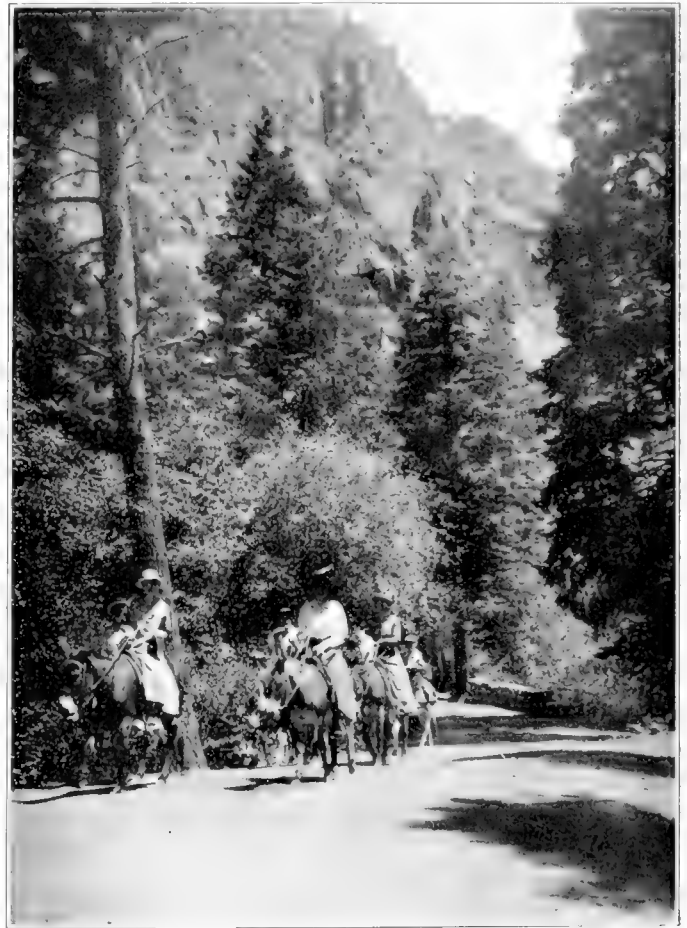
When the brush is burned after a timber cutting there is little to show that there was any cutting.

lies within the protection stands at the higher altitudes; and by adding to this the areas lower down in the commercial stands which are too rough to permit logging, it is safe to say that at the very least one-fourth or one-third of the forested areas, and the most picturesque, will never be encroached upon by the axman.

Aside from the fact that most of the timber on the more scenically important parts of the National Forests is through its non-commercial character, in no danger from the lumberman, Uncle Sam is going to see that unusual scenic features and recreation possibilities may be of the highest service to their owners—the people—by being kept and developed primarily for their recreation values. For example, the city of Denver has acquired a considerable acreage of foothill timbered land west of the city, which is being rapidly developed as Denver's Mountain Park. Excellent roads are being built, camping sites with permanent fireplaces established, shelters erected, and other improvements made to bring out and make usable the recreation opportunities. Thousands of people from Denver and elsewhere motor through this park every fair Sunday and holiday. Alongside this park area is a tract of land within the Pike National Forest which has the same general characteristics and is visited and enjoyed in conjunction with the city's lands. It is the aim of the Forest Service to administer this area primarily for the development of its recreation values, since it can serve its most important use in that way. There is a working arrangement with the city officials

whereby any timber sales applied for will be considered first as to their possible effect on the scenic values of the region. If the timber is well away from the roads, where its cutting could not detract from the esthetic values, the sale will be made; but if travelled roads cross or go near the area, or if it is of special scenic importance, the timber will be preserved intact.

On such areas, so intensively used for recreation, many of the mature trees, if not deformed or defective, which would be cut in an ordinary sale, have a picturesque character which adds materially to the beauty of the region, and their retention as "scenery" is felt to be fully warranted. Similarly, along important scenic automobile highways which traverse the National Forests, the same rule would be applied to a strip of timber on either side of



TOURISTS IN THE PIKE NATIONAL FOREST, COLORADO

These tourists are in North Cheyenne Canon on a holiday trip. Note the ragged tree with dead limbs at the roadside. If this were removed the remaining forest growth would be more attractive. Timber sale cuttings would do just this.

the road, so that the forest may play its part to the fullest extent in making the route attractive. Either the natural protection, or that which is afforded by the policy of the Forest Service, will, then, take care of the great bulk of the timber part of the most important National Forest scenery. Possibly a brief discussion of the way in which the National Forest timber is cut will serve to show that little inroad is ordinarily made on the scenic feature even in the commercial stands.

Many of the forests of the Northwest have such a dense undergrowth of shrubs and vines that one may

travel only on hewed-out trails. To a somewhat lesser degree the same conditions are found in the Engelmann spruce forests of the Rocky Mountains. Here, in many places where the timber is very much over-ripe, great numbers of the overmature trees have become decayed and have fallen, mingling in a mass through which a horse cannot go at all, and where a pedestrian's progress is only a combination of crawling, squirming, and climbing. Such forests are just as scenic as any other when viewed from a distance, for in a bird's-eye view timber is just timber; but to get the true and greatest enjoyment out of the forests one really must get into them, not only on travelled roads and trails, but along the byways where there is nothing to guide but one's inclination. To the writer there is no outdoor experience more enjoyable than rambling about through a stand of big trees under which the

forest floor is a carpet of needles clear of fallen trees and other evidences of decay. Those familiar with Western yellow pine timber know what this condition is, and the same is true, with of course far more impressiveness, of many of the stands of big trees (Sequoia) in California.

If left to itself the forest will grow up and grow old, have its youthful and old-age diseases, and become crippled and infirm, just like a human being. At the outset a young forest is made up of thrifty little trees, each striving to grow into a big tree, and each fighting for its share of light and moisture. There are usually more trees on the ground than there is soil moisture for, and they are so crowded that each one cannot get all the light it needs, so the law of the survival of the fittest comes into play, and the less sturdy members drop behind in growth, are overtopped and starved for moisture, and eventually die or become merely struggling stunted specimens. The stronger trees continue to grow into a full stand, but they are not immune from attack by disease and insects, and many of them become the victims of fungus diseases, mistletoe, and insects, which sometimes kill them, while others are merely deformed. It is when the trees reach maturity, when growth virtually stops, and become really "old," that they are the most susceptible, either through disease which has previously attacked them, or because they have not the vigor of youth to combat attacks, and large numbers of them develop spike tops or "staghead-ness," where the top dies back several feet, or the top is

broken off, or forked trees split and lose one fork, or otherwise show some prominent sign of infirmity. If attacked by insects the whole tree may die, standing for a few years, and then falling down. The usual mature forests, then, is made up of a mixture of thrifty and infirm trees. Added to the crippled green trees are dead ones, both standing and fallen.

Under the law which authorizes the sale of timber from the National Forests, the primary object of a sale must be to preserve "the living and growing timber and promote the younger growth." The men who manage the National Forests have worked out plans under which the greatest benefit will accrue to the stands of timber through judicious cuttings. Before any living tree is cut it must be designated by a Forest officer. The officers who do the marking go through the stand, selecting



SCENIC VALUE NOT TO BE DESTROYED

Around lakes visited as recreation areas no cutting would be allowed in a strip of timber around the lake and deep enough to insure no detracton from the natural beauty of the place.

for cutting those trees which are mature or overmature, and those immature ones which are in some respects defective or which need to be removed to thin crowded groups so that those left in the group may have room to grow and develop properly. All the young and middle-aged trees which are sound and thrifty are left, and they will greatly increase in size and value before the next cuttings on that area. After the cutting under these marking principles the remaining stand is free of the "spike-tops" and other cripples, and presents a thrifty appearance far more pleasing to the eye of many than the "unbarbered" stand. Furthermore—and this is a vitally important thing—the removal of the diseased overmature trees has eliminated a vast amount of fungus disease, and materially decreased the opportunity for infection of healthy trees, so that the stand has not only been put in much healthier condition, but it has much better chances of remaining healthy.

Under the marking system which has been outlined the cutting is in every sense a moderate one. For example, on a large tie sale in lodgepole pine timber on the Medicine Bow National Forest in southern Wyoming a sample area was marked to show the purchaser how the marking principles would be applied. On the area covered by the sample marking there were on the average 347 trees per acre which were six inches and more in diameter four and a half feet above the ground, and of these only fifty, or less than 15 per cent, were marked for cutting, leaving

almost two trees for every square rod. On this same area the marking took only 37 per cent of the trees 10 inches and over in diameter at breast height. At the same time all the trees which had reached a sufficient size to be mature for cutting as tie trees were marked, and the lumbermen got the ripe crop, while the unripe timber was left, having both its future commercial and present esthetic values intact. When the stand is ready for cutting again, and at each succeeding cutting, the same marking principles will be applied, but the second cutting will be done when the trees now middleaged reach maturity, and before they become overmature and infirm, so that there will never again be the large number of defective trees in the stand there were in its virgin condition; and both commercial and esthetic values will always be at the maximum.

Forest Service sale contracts specify that stumps must be cut low to secure the fullest possible utilization of the tree, and that all the brush and other debris resulting from the cutting must be disposed of in a specified manner.

The limbs are trimmed off the unused portion of the trunk and wherever the fire danger is great they are piled and burned; while in localities of small fire danger the brush is frequently scattered out in a thin mat so that it will decay rapidly and disappear. Thus, with the low stumps, and after the brush has been disposed of, the ground on which cutting has been done shows little evidence of the cutting, and one going through the cut-over stand on snow deep enough to hide the stumps would ordinarily never realize that any cutting had occurred. Under the usual marking systems employed in National Forest timber sales, then, the permanence of the forest is assured.

With Uncle Sam spending hundreds of thousands of dollars every year on good roads and trails to make the National Forests more accessible to the public for recreation—and they are coming to be more and more the nation's playgrounds—the people can rest secure in the knowledge that he is going to bring lumbering and esthetics together so that each shall occupy its logical place.

PINE BLISTER DISEASE QUARANTINES

A QUARANTINE against the shipment of white pine seedlings west of Minnesota, Iowa, Missouri, Arkansas and Louisiana and including these states was recently ordered by the Federal Horticultural Board of the Department of Agriculture. This action followed the passage of the amendment to the quarantine law giving the Board increased power and the hearing on the quarantine proposition on April 10 at Washington. The further importation of currant and gooseberry bushes from Europe and Asia on which the white pine blister disease may be carried is also prohibited. A supplementary order of the Horticultural Board prohibits the shipment of five-leaved pines or black currant bushes from the heavily infected region comprising the New England states and New York to any point outside. This additional quarantine is made for the purpose of protecting other quarantined states as well as the remainder of the country from possible infection.

The quarantine was first made effective on June 1, but the Board later, learning there was a considerable movement under way of possibly infected white pines and to a less extent black currants from New England to states lying west and south, amended the original quarantine covering that section and made it effective May 1.

The Board explains that the quarantine was first made effective June 1 because: "the fixing of the effective date of these quarantines at June 1 was done solely in the interest of the nurserymen in recognition of their needs and of their spring contracts for delivery."

And adds: "It is hardly necessary perhaps to say that the Board will expect nurserymen, in return, to scrupulously respect state quarantines in relation to the pines, currants and gooseberries covered in these orders, and it is understood that in the meantime the voluntary agreement of a year or more ago not to ship any white

pines or currants or gooseberry plants into the Rocky Mountains or Pacific Slope states is to remain in full force and effect. The inspectors of these western states have been notified of this understanding."

These quarantines, together with the \$300,000 appropriation made by Congress for the suppression of the pine blister disease, follow the widespread public agitation of last fall and early this year, lead by the American Forestry Association, to secure national and state action against the disease which threatens to wipe out white and other five-leaved pines of this country and Canada valued at over \$500,000,000.

The various states have taken action, to date, as follows, the quarantines, unless otherwise specified, being against pines, currants and gooseberries:

California—Quarantine against all five-leaved pines and currants and gooseberries from points in the United States east of the Mississippi.

Delaware—Quarantine against all points outside the state.

Idaho—Quarantine against New Hampshire, Vermont, Massachusetts, Connecticut, New York and Pennsylvania.

Indiana—Quarantine against all points outside the state.

Kansas—Quarantine against all points outside the state.

Massachusetts—Quarantine against white pines from Europe, and an appropriation of \$50,000.

Michigan—Quarantine against all points outside the state.

Minnesota—Quarantine against all five-leaved pines in New England, New York, New Jersey, Pennsylvania, Ohio and Wisconsin and an appropriation of \$15,000.

Montana—Quarantine against New Hampshire, Vermont, Massachusetts, Connecticut, New York and Pennsylvania.

Nevada—Quarantine against territory east of the Mississippi, Minnesota and all foreign countries.

New Jersey—Quarantine against five-leaved pines from all New England, Pennsylvania, New York, Minnesota and Wisconsin.

New York—Quarantine against five-leaved pines from New England, Ohio, Indiana, Minnesota, Wisconsin, Pennsylvania, Illinois and New Jersey; and an appropriation of \$15,000 as well as \$10,000 already given for suppression. Also black currants are declared to be a public nuisance, are to be eradicated and all necessary state quarantines enforced by the state authorities.

Ohio—Quarantine against five-leaved pines from all points outside the state.

Oregon—Quarantine against territory east of the Mississippi and all foreign countries.

Pennsylvania—Quarantine against all five-leaved pines from points outside the state. The appropriation bill is still in the legislature.

South Dakota—Quarantine against all points outside the state.

West Virginia—Quarantine against all points outside the state.

Wisconsin—Quarantine against five-leaved pines from points outside the state.

Nebraska—The State Entomologist is authorized to declare a full quarantine.

Maine—Appropriation of \$5,000 for 1917, \$5,000 for 1918 and power to destroy pines, currants and gooseberries, to fix a compensation and to quarantine.

Vermont—Appropriation of \$25,000 to include campaign against gypsy moth and other plant insect and disease control work.

New Hampshire—Appropriation of \$28,000; the state forester is given power to destroy pines, currants and gooseberries except in nurseries, and the state nursery inspector has quarantine power.

Rhode Island—An appropriation of \$25,000.

Connecticut—An annual appropriation of \$7,500 and \$5,000 extra for use during the currant season.

Virginia, North Carolina, South Carolina and Maryland are now considering stricter quarantine measures to keep out the disease.

A NECESSARY QUARANTINE LAW

AGRICULTURE has long suffered unwarrantably from pests—the alfalfa weevil, the boll weevil, the grape phylloxera, for instance.

"This is especially true of that great department of agriculture, the Forest Service—a service which embraces privately-owned as well as publicly-owned forests. They have had to face the onslaught of the brown-tail moth, the chestnut blight, and now the pine blister rust, which threatens the white pines of the United States and Canada, valued at over \$350,000,000. The only way to control the disease seems to be to eradicate in the neighborhood of white pines the currant and gooseberry bushes, both wild and cultivated, on which the rust propagates and spreads to the pines, and to institute strict quarantine laws.

"The pine blister rust has not heretofore been widely prevalent in America. It now exists in the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Wisconsin, and Minnesota. Hence it is necessary to quarantine these states, together with portions of other states, prohibiting the movement from them to other states of five-leaved pine nursery stock and of currant and gooseberry stock. In addition, the movement of this stock from the most seriously infected states (the New England states and New York) to the less seriously infected states should also be prohibited, as should be the importation of all currant and gooseberry plants from Europe and Asia.

"It is a satisfaction to know that these three things are now being done, and that our Government can follow the examples of Germany, Austria, France, Holland, and Switzerland in enforcing quarantines. Among the measures passed by the Sixty-fourth Congress the new Quarantine Law has escaped general notice, perhaps because it was passed on Sunday, March 4, just before adjournment. It is one of two amendments to the Agricultural Appropriation Bill, added because of the urgent plea made by the American Forestry Association. The first of these amendments appropriated \$300,000 for the investigation and eradication of the pine blister rust. The second gave to the Federal Horticultural Board of the Department of Agriculture authority to declare effective quarantines against tree and plant diseases. Existing law permitted the Board to declare a quarantine only where a dangerous plant or insect infestation was known to exist. Of course such quarantine was manifestly inadequate. The Board needed the power to declare a quarantine wherever quarantine should be necessary to prevent the spread of the infestation.

"All lovers of the forest and all who are interested in forestry in any way will be relieved to know that at last our Government has the power to deal effectively with disease, and has taken three necessary measures to that end."—From the *Outlook*, April 16.

YE GOUSEBERRYES

IF the fight which is being launched this year to save the white pine forests from destruction by the pine blister rust proves successful, gooseberry jam will be a rarity. In a curious old manuscript of the 17th century, *Recettes Medicales d'autrefois a Jersey*, we are told how our forefathers made "gouseberry custurd":

"Take a posnet and put in a little rose water, put in gouseberryes as many as you thinke fitt, then put them into the posnet and boyle them till they be boyled to peaces, then take them up and beate to yealkes of eggs and put them in ye gouseberryes, then put it into a platten, and then put sippetts into the platten but you must first of all sweeten it very well."

AWOOD specimen found in glacial drift and estimated by the Wisconsin State geologist to be approximately half a million years old has been identified by the Forest Products Laboratory of the Forest Service as spruce.

EDITORIAL

CUT-OVER LANDS A NATIONAL PROBLEM

NO nation, with the possible exception of Russia, in Siberia, has ever become possessed of such an enormous area of land capable of agricultural development as the United States. In the Colonial period, the energy of our mixed but largely English stock, confined by the barrier of the Appalachians, and by the ferocity of the Iroquois tribes in western New York, expended itself upon the crowded and not very fertile soils of New England and the Atlantic seacoast. The extent of this clearing greatly exceeded the limits of normal development, and visitors in New England are frequently amazed at the evidences of past cultivation of barren hillsides and rocky thin-soiled pastures.

With the bursting of the great Appalachian dam, about the time of the Revolutionary War, this flood of pent-up energy flowed westward, first clearing the fertile wooded soils of the "Northwest territory," and the more mixed and spotty areas of the South,—then, with increasing force, deluged the prairies of Illinois, Iowa, and the Great Plains, where the settler no longer had to clear his land of stumps and forest growth. The gold rush of '49 carried the wave of settlement to the Coast, while the backwash from this wave filled the interior basins.

This great westward movement took the cream of the public lands—those most easily cleared, most fertile, and best located. Then came a further great absorption, this time of public timber lands, accompanied by the building up of large units of ownership through the assembling of smaller tracts, so that the business of lumbering might be profitably and economically conducted.

About the time that lumbering, conducted on a gigantic scale in the Lake States, began to reach a stage of exhaustion, and the area of cut-over lands had mounted to large figures, the available fertile and watered public lands of the country had been almost completely absorbed. Immense areas remained, but these were too mountainous or too dry to be farmed under the Homestead Law. About this time, too, many farmers' sons in the richer sections, and others from overcrowded cities, began to seek a foothold on the soil.

This pressure created a market for cut-over lands. Up to this time, the Lake States lumbermen had abandoned large areas after removing the timber, rather than pay taxes. It was natural that they should seize the opportunity to realize something from the sale of this cut-over land,—and a second era was ushered in by the advent of the land speculator, who bought up large tracts at very low prices, often realizing several hundred per cent by selling to customers at from \$5 to \$10 per acre.

But the clearing of a farm from either timber or cut-over land is pioneer work, requiring years of hard physical toil, or else the expenditure of considerable capital to make headway in removing stumps and bringing the raw soil under the plow. Buildings must be erected, the land must

be fenced, agricultural machinery and livestock acquired, and the roughness of the soil subdued to permit proper cultivation. Studies made of clearing land show that the actual costs of removing brush and stumps and breaking the soil will reach figures that in some parts of the Pacific Northwest are prohibitive. When added to this we include the cost per acre of the fencing, building and other capital, and the cost of living during the period when the farm is being brought under cultivation, we are faced with the fact that *the true economic value of cut-over and unimproved lands is very low as compared with these same lands after this investment has been made.*

The pioneer on government land incurred no cost but his filing fees and his labor. A great item in reducing his living expenses was the plentiful supply of wild game in these new regions. Coming of rugged stock inured to hardships, with simple wants, he usually succeeded in subduing the forest and carving out a farm. The modern pioneer is confronted at the outset with an expense of purchasing his land. Too often he is city bred, ignorant of farming as a profession, unable to do without many of the modern luxuries, and soon discouraged both by the unwonted hardships encountered, and by the comparative loneliness of life on a new farm. But even if he comes of good farming stock, or from the hardy races of immigrant peasantry of Europe, he has to face the three handicaps not known to our fathers, the first cost of soil, the absence of wild game (or restrictive game laws) and the comparative poverty of the soil. For all will admit that the richer soils were the first cleared and settled. Is it any wonder that the saying is current that it takes three crops of settlers to subdue a farm in the wooded sections? The final owner builds his success upon the ruined hopes and wrecked investments of his less fortunate predecessors.

The area of cut-over lands in America is enormous, and is increasing every day. What is going to be done with these lands? Are they to remain a wilderness, scorched and blackened by repeated fires, on which not even a second growth of timber can succeed in establishing itself? Or, worse—are these lands to remain as an enormous sponge, in the hands of land speculators, who by playing upon the credulity and eagerness of land-hungry purchasers, and by charging many times the intrinsic value of the lands, deprive them of their entire store of savings and leave them a mortgage in place of the capital absolutely required for farm development? When the victim fails to meet his interest, the sponge is squeezed dry, the purchaser evicted and the land is again on the market to soak up more savings.

The time was in this country when any method of making money, not prohibited by law, was considered legitimate, and the operations of dealers in cut-over lands were regarded as beneficial to a community by bringing in

new people to spend money in the neighborhood. But of late there has been a tremendous awakening, North, South, East and even in the far West, the land of the booster and the optimist. America is tolerant of wrong, but only up to a certain point. Bitter experience has recently taught many communities—even entire states—that a defrauded purchaser and an immigrant who fails does tremendous harm to the reputation and fair name of the region. Associations of land dealers have even been forced in self-defense to abandon their methods of flamboyant advertising and employ experts to determine cold, hard facts as to the value of the lands they were endeavoring to sell,—and this because sales had become impossible, due to the bad name fastened upon the region through avarice and irresponsible speculation.

For the first time, too, the various state and governmental agencies seem to have become aroused to the need of a vigorous exposition of facts, and to have lost their fear of incurring the displeasure of entire communities acting under the leadership of these land-selling interests.

The fight for an equitable policy in the sale and settlement of raw lands, a policy which demands that the value of these lands shall be placed at its true figure instead of being inflated, is by no means won. But if many more

such conferences as the Cut-over Land Conference recently held in New Orleans are brought about, we may hope for great things in the near future. The Conference passed, among others, the following resolution: "*Be it further resolved*, that inasmuch as many acres of this area are better adapted for forest growth than for agricultural crops, the Association shall undertake to further and promote the development of approved forestry methods, looking toward reforestation of such areas, for the benefit of future generations, and where practicable to combine such reforestation methods with livestock development."

The day of the pioneer is not gone in America—we need him more than ever to help bring under cultivation the enormous areas of cut-over land suitable for agriculture. Let us do him economic justice, and give him at least as favorable an opportunity to make good as our forefathers had, and cease our efforts to deceive him into thinking that cut-over lands are worth just as much in their raw state as they will be after he has put into them all he has, his capital, and his life blood. We wish success to the high-minded and patriotic stand taken by those Southern lumbermen, owners of 76,000,000 acres of cut-over land, who have pledged themselves to the policy of fair dealing with the settler, regardless of immediate profit to themselves.

SHALL THE NATIONAL FORESTS BE MADE SELF-SUPPORTING?

WHEN the National Forests were first placed under efficient administration it was the expressed hope and intention of the United States Forester to make them self-supporting within five years.

But with the development of the work, the magnitude of the task of protecting, developing and administering some 160,000,000 acres of wild and inaccessible land became better understood and the appropriations for these purposes still exceed the income by over \$2,000,000. In 1916 the income from the forests totalled \$2,800,000, which is three-fourths of the sum required to protect and administer them, the remainder being spent for permanent improvements, and for forest investigations. Receipts are constantly increasing, the income for 1916 being greater by \$340,000 than for the previous year.

Until recently, Congress was somewhat inclined to criticize the Forest Service for its apparent failure to establish the National Forests on a self-supporting basis within the stipulated five-year period. Enemies of the national policy have cited the excess of expenses over income as a proof of extravagance and failure of the whole program. But of late a distinct reversal of attitude is noticeable, and the Service has apparently justified its policy beyond further question.

The principal cause of this change of heart is the fact that the leaders of Congress have become practically convinced that the administration of the National Forests is economical and efficient. A cost of less than 2½ cents per acre per year for all purposes directly connected with protection and management is not an extravagant sum to pay for the character of service secured.

The two principal sources of income are fees charged for grazing livestock and receipts from the sale of timber. If the forests are to become self-supporting it must be mainly

from the utilization of these two resources. In either case, *the income received cannot be made the primary consideration*, yet the Government must obtain from the sale of these resources what they are actually worth on a competitive basis, otherwise an unfair commercial privilege is received by the successful applicant, which reacts injuriously on his immediate competitors and upon the public, which would lose the revenue, their only return in lieu of taxes which would be paid were these lands privately owned.

For a long time the fees charged for the grazing privileges were too low. But as soon as steps were taken to correct this injustice, those stockmen who then held the grazing privileges protested that the present income from grazing was more than sufficient to pay the cost of administration, and therefore the fees should not be increased! This was the old doctrine of self-support, but with a decidedly new application! When the grazing fees have been fully adjusted—which has not yet been accomplished—the revenue from this source alone will total over \$2,000,000.

In seeking to apply the same principle of charging the true value of the resource to the sale of timber stumpage the Forest Service has had a problem which has called forth its best efforts—not only for the fixing of the proper price of stumpage, but in deciding upon the quantity which should be sold. If the sole object of the Service had been to increase the income in order to make a showing for Congress, they could have done so by offering large bodies of timber at reduced prices (thus approaching the old policy by which four-fifths of our timber was sold or given away for a few cents a thousand feet under our land laws). But against such a policy stood the principle that timber resources must bring in the actual ap-

praised value of the stumpage—and this principle has been strictly adhered to at all times. In fact, the foresters employed by the Service have developed timber appraisals to a science which in thoroughness and accuracy exceeds anything previously attempted by private corporations.

Even with this check upon excessive sales of timber, opposition is still strong in some quarters against *any sales of national forest timber whatever*. This is especially true in regions like Washington, Oregon and Idaho, where there is an overproduction of lumber. It reaches an acute stage when the Service appraisals show stumpage values less than those desired or expected by the owners of small tracts of private timberlands acquired under the homestead, or stone and timber laws. There is much excusable ignorance of the factors which determine stumpage values on the part of such land owners. The prices paid for stumpage do not in any case determine the price of lumber,—but on the contrary, the lumber prices, less the cost of manufacture, transportation and logging, are the only ultimate basis for the value of the stumpage. Stumpage prices cannot be regulated by law. It has been pro-

posed—for the benefit of timber owners—to set a minimum price upon National Forest timber. The only effect of such a law would be to prevent the sale of such timber at all, except where it was actually worth more than the price set. It would not serve to increase values.

Whatever is the outcome of these conflicting economic factors, one thing is certain—that the income from the National Forests must be based upon other considerations than those of profit and loss on the administration. What other department of the Government is placed upon this basis? Are we to eliminate the educational activities and experimental research of the Service because it is not productive of immediate revenue? And what value shall we place upon the protection afforded to watersheds and irrigation throughout the west, or upon the recreational and scenic features of the forests, which require an expensive system of fire protection?

The National Forests may become self-supporting, and even produce a surplus income. We do not care how soon this occurs, nor should we tolerate the sacrifice of a single economic principle or public benefit to attain such a result.

A VICTORY FOR EFFICIENCY AND ECONOMY

THE Minnesota Forest Service, since its establishment in 1911 by the employment of a trained forester, has been a model for other states. The ideals sought by this law were complete freedom from political influence, the appointment of all agents strictly on a basis of merit, and the enforcement of regulatory police powers to secure fire protection, without fear or favor, against both the rich and influential, and the man of smaller means and less responsibility.

These objects have been completely attained, by the continuance of the Minnesota State Forestry Board of nine members, with power to appoint and to protect their own executive agent, the State Forester.

But the movement for efficiency and economy, initiated in Minnesota four years ago, and gaining great headway, with practically no real opposition, suddenly developed into a sinister attack upon the integrity of this State Forest Service. The so-called Public Domain Bill, which sought to effect a great consolidation of the departments of lands, forestry, immigration, highways, fish and game, drainage, waterpower, and mines, under a single all-powerful commissioner, who should appoint subordinates over various of these departments, included a provision abolishing both the State Forestry Board and the State Forester's office. The independence and integrity of the forestry department was to be completely destroyed by creating a new department of lands, forestry and immigration, under a political subordinate, who in turn would have control of an official of third rank charged with the former duties of State Forester.

Whether this plan was deliberate, or arose from the inability of politicians as a class to grasp the essential principles of efficiency in state work, the effect of such a measure, if passed, would obviously have been to put an end to the effective enforcement of the law requiring log-

gers to burn their slash, and to throw the entire machinery of state forestry back into the morass of patronage and party politics. Against such a result the American Forestry Association lodged a vigorous protest.

Partly through the Association's efforts exerted along educational lines in calling the attention of the people of the state to this situation, and partly because of vital defects in the bill itself, which not only failed to secure economy but threatened to destroy certain essential safeguards now in force in the methods of handling public property of immense value, this imprudent and dangerous measure was finally defeated, not once, but twice—for after the first defeat in the State Senate, a duplicate bill passed the House, only to be again consigned to oblivion in the Senate.

It was freely claimed that this bill would create a vast political patronage—a part of which would have been represented by the field force of the State Forest Service, deprived of their directing head, the State Forester, and subjected to the influence of the party in power. For the present, this movement to capture the State Forestry Department has been definitely side-tracked. But the people of Minnesota may not yet realize that under the cloak of efficiency and economy, the effort to reduce all state departments to a system dependent upon influence and partisan politics, will surely be continued. There is much to be learned by our states if they ever expect to attain a really efficient and economical administration of their internal affairs—and it is time that the people as a whole came to a better understanding of the need for skilled services and merit in the management of state departments requiring technical direction. They would then be less apt to swallow the sugar-coated pill of consolidation whose apparent purpose is to improve the state machinery, but whose effect is often to tear down its most efficient units.

A GROUP OF LOW-COST COUNTRY HOUSES

BY RAWSON WOODMAN HADDON

IN any consideration of the small and inexpensive country house it is well to remember at the very start that, to the architect, far less ingenuity need be brought to bear upon the work at hand in the designing of a very large and expensive building where whatever economies that are practised are the result of choice and not of necessity, or in a very cheap house, where all but the main essentials are necessarily eliminated, than is the case with the house of moderate cost in which it is desirable to embody with good design not only convenience and comfort but rigid economy as well.

And the time spent, therefore, in the designing of a low-cost house, that is, of the type costing less than five or six thousand dollars, is quite as great as the time necessary to design one costing from five to twelve or fifteen thousand dollars.

For this reason it is perhaps a natural result that small houses are seldom designed by architects of anything like national reputation, or, as a matter of fact, by any architect at all, excepting, too often, by men who attempt that impossible combination of which we so often hear, the "architect and builder."

An exception to this general rule is found in a group of houses recently built on Indian Hill, Worcester, Massachusetts, under the supervision of Mr. Grosvenor Atterbury, of New York City. Mr. Atterbury's work at Forest Hills, Long Island, and his connection with many such large town planning developments is well known.

Among the various suburban developments that have been undertaken during recent years none surpass—while few, indeed, even equal in interest—this work which was

recently undertaken by the Norton Company of Worcester, on Indian Hill, a large tract of some hundred and fifteen acres or more of undeveloped land near that city. The development was undertaken in the interest of three thousand seven hundred or so various employees in the company's factories nearby.

While various developments of a similar kind, some larger and some smaller, have been undertaken in Europe that are very nearly perfect from the point of view of good architecture and good town-planning, it is, nevertheless, a lamentable fact that the few developments found in America until the immediately recent years have been, without exception, most noticeably lacking in any qualities of good, substantial design,

and in any suggestion, however slight, of rational landscape or town-planning.

For the reason, then, that the Indian Hill development contains within itself all these desirable characteristics, both in the houses separately and as a development as a whole, and because the actual work, while praiseworthy in design, is at the same time economical in construction, this development marks a most important period, just as Forest Hills has done, in the history of matters of this sort in the United States.

The pest of the poorly arranged and often wholly uncomfortable as well as unsanitary dwelling that is too often found in large suburbs where even much more expensive houses are erected is by no means confined to any one section of the country or to any one class of dwelling, and for this reason whatever results may have been obtained in any development, large or small, are equally of interest to the individual



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owner who is planning to build a single low-cost home of his own, or to those who are opening up large tracts of land upon which many suburban homes are to be built, either as industrial or everyday suburban real estate developments.

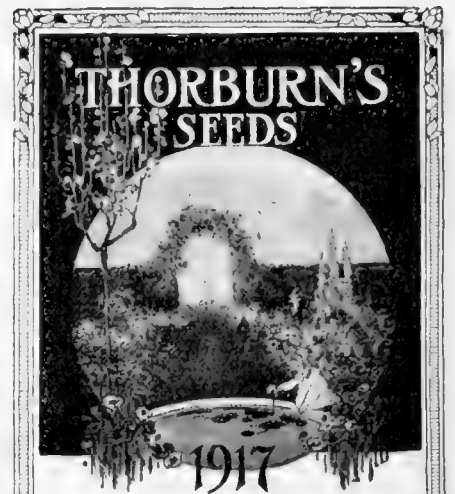
It was not so very long ago that building market conditions were in such shape that to design a house costing not more than three thousand dollars was comparatively simple. At the present time conditions are such that to duplicate a three-thousand-dollar house built not so very long ago would now cost considerably nearer five thousand. Mr. Atterbury has succeeded, in spite of this, in designing a group of buildings each of which can be sold, with land complete, for considerably less than it would cost to build less carefully and skilfully arranged houses containing the same number of rooms and the same conveniences.

While it is not often that so excellent a building site is selected for development, it also remains true that not often has the architect and town-planner so carefully and successfully selected his materials and designs to harmonize with the site and with the local traditions of the surrounding country. This has been true even when conditions of site and surroundings have been equally favorable.

The main point of interest, then, in this particular development, lies in the fact that these houses could be reproduced in other parts of the country at figures only slightly varying from their cost at Indian Hill.

None of the houses are over-large or expensive. In the matter of size, the area of the buildings has been kept down to a minimum by a skilful use of every inch of space within the walls. There are no useless and unnecessary large halls or other wasted spaces, while, on the other hand, the planning is neither

(Continued on page 312)



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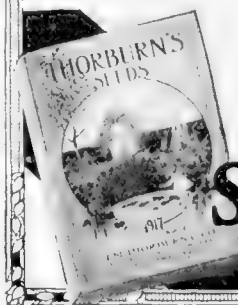
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Mr. Wm. H. Grafflin, Falsion Manor, Glencoe, Baltimore Co., Md.

"The work done at my place has been done in a very satisfactory way and you are fortunate in having such efficient and industrious employees, a refreshing experience in these days of carelessness and shirking."

Mrs. Chas. G. Weld, Brookline, Mass.

"I am very much pleased with the result of your work on my trees. . . . From their present appearance I do not see why they should not last many years longer, whereas last year we had grave doubts as to their living."

THE tree is a living organism; it breathes, assimilates food, has a real circulation. Its normal condition is *health*, but it is subject to disease and decay just as any other living thing. As with one's body or one's teeth, the tree responds only to that treatment which is in scientific accordance with Nature's laws.

The physician, the surgeon, or the dentist requires years of patient study, plus the intuitive skill born of ripe experience, before he is equipped to obtain successful results. This is also exactly true in Tree Surgery. However, in Tree Surgery, scientific accuracy is not enough. Think of the terrific windstorm with its bending and twisting! You will then realize that Tree Surgery must be mechanically perfect to withstand it. The mechanical principles and methods of bracing employed by a real Tree Surgeon would amaze you.

Trees cannot be "patched" like barn doors. Men without long training and experience cannot save them. Tree Surgery is a science unto itself—a science demanding highly specialized knowledge and remarkable skill for its successful application.

Facts little understood

Because the facts set forth above have not been understood, great injury has been done to thousands of trees everywhere and a vast amount of money has been wasted in disastrous tree "patching." It has been the fault of nobody in particular. Tree owners simply have not realized the degree of scientific knowledge and mechanical skill required in the permanent saving of trees. And "tree patchers"—the men who have been doing the faulty and dangerous work—are in many cases conscientious enough, but ignorant of the facts and lacking in skill.

Photograph No. 1 illustrates a typical case of tree "patching." To the untrained eye this work probably looks good, but a Davey Tree Surgeon saw at a glance that the conditions were bad. Growths of fungus disease appeared along the edges of the filling and on the bark between the large and small fillings.

Photograph No. 2 shows the filling taken out. Nearly every principle of the science of Tree Surgery had been violated—the rough decay *only* had been removed; the cavity had not been disinfected; the condition of decay behind this crude cement patch was actually appalling, and the filling had only been in two or three months; no bracing of any kind had been used; no means had been provided to exclude moisture; the large filling had been put in as a solid mass, making no allowance for the sway of the tree.

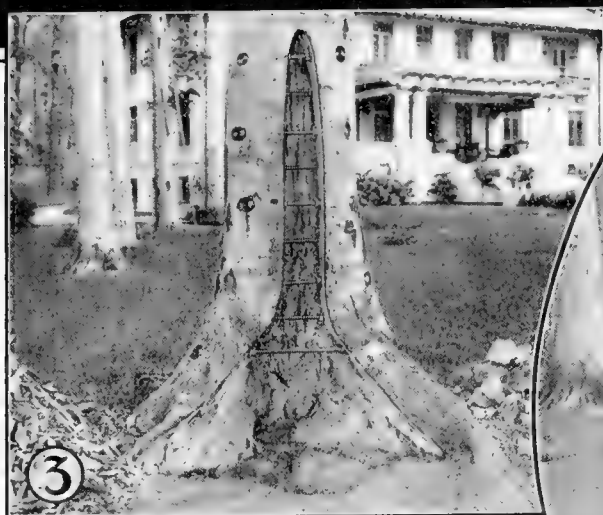
Photograph No. 3 shows all decay removed by a Davey Tree Surgeon; the cavity thoroughly disinfected and waterproofed; the mechanical bracing partly in place; the watersheds cut to exclude moisture.

Photograph No. 4 shows the Davey filling completed, put in sectionally to permit swaying without breaking the filling. This tree has since stood through many severe storms in perfect condition. New bark is now growing over the filling along the edges. The tree has been saved permanently!

Davey Tree

Every real Davey Tree Surgeon is in the employ of the Davey Tree Expert Company and the public is cautioned against those falsely representing themselves

save your trees!



All decay removed, cavity disinfected and waterproofed, mechanical bracing installed.

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It is scientifically accurate and mechanically perfect.

Your trees, many of them the product of several generations, are priceless. Once lost, they cannot be restored in your lifetime or that of your children.

To whom shall you entrust them? There can be only one answer, for there is only one *safe* place to go—to Davey Tree Surgeons.

Safe—because Davey Tree Surgery is time-proved; its record of successful performance for thousands of estate owners spans a generation.

Safe—because no Davey Tree Surgeon is allowed any responsibility until he has conclusively demonstrated his fitness. He must have served his full course of thorough, practical training and scientific study in the Davey Institute of Tree Surgery—a school, the only one of its kind in the world, which we conduct for the specific purpose of drilling our men according to Davey methods and Davey ideals.

Safe—because we who know values in Tree Surgery and who demand and deliver

the best, select the man to whom the treatment of your priceless trees is to be entrusted.

Safe—because Davey Tree Surgery has been endorsed as *best* by the United States Government after an exhaustive official investigation.

Safe—because Davey Tree Surgery is recommended by thousands of prominent men and women, whose endorsement you can accept with complete confidence. (Several such endorsements appear on the left.)

Safe—because Davey Tree Surgeons are *picked* men, thoroughly trained, conscientious, intelligent, courteous, in love with their work. "Men," writes Dr. H. D.



This is Davey Tree Surgery. It is scientifically accurate and mechanically perfect. The sectional filling permits swaying without cracking.

House, New York State Botanist and formerly professor in Biltmore Forestry School, "who would do honor to any institution of learning in America."

Safe—because the Davey Company is a successful and responsible house, amply able to make good in every instance, and not needing, for the sake of temporary existence, to sacrifice in the slightest degree its high standards.

Tree "patching" cannot save your trees. Only scientific, mechanically perfect treatment by men trained through years to the point of finished skill can be permanently successful. And for such treatment by such men there is only one safe place to go—to Davey Tree Surgeons.

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SMALL SINGLE HOUSE

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(Continued from page 308)

cramped nor is there noticeable a lack of closet room or other arrangements.

As to cost, the typical houses containing a living-room, dining-room, kitchen, three bedrooms, a bathroom and a porch, are sold for three thousand two hundred and eighty-five dollars, with the ground upon which they stand, and the double houses, containing an additional bedroom on the second floor sell for three thousand six hundred and thirty dollars.

Naturally these are figures that should cause some amount of thought. The houses could, perhaps, have been built even more cheaply, but the materials in that case would have been inferior, and as they have been built the buyer at Indian Hill, just as every purchaser or builder of a house should be, may have absolute confidence in the fact that the materials that have gone into his house are of the best. There is, perhaps, no material so well suited for the problem as the simple frame construction that was used.

It is a notable fact, too, that frame construction was decided upon by the architect only after careful consideration of all the practical and artistic points involved. Certainly nothing more picturesque could have been found to take the place of the white texture of clapboard walls as seen in a setting such as that at Indian Hill.

While this work, with Mr. Atterbury's other work of a similar nature, marks a high period of advance in more or less paternalistic industrial activities we are not so largely interested in that phase of the question as we are in the fact that the architect has shown us how well and comfortably and economically a suburban house may be built.

In these houses we see not only examples of good design but examples of complete homes—and there is a difference in a "home" and a "house." Every detail, then, is worthy of mention. The structural framing of the houses is built of North Carolina pine, as is the interior trim. On the shingled houses cedar shingles were used.



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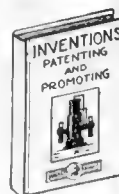
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IT IS IMPERATIVE

that all land owners appreciate the true situation and that patriotic citizens enlist together for national agricultural coöperation to remove the causes and to further intelligent concerted action to advance the agricultural industry in the United States of America.



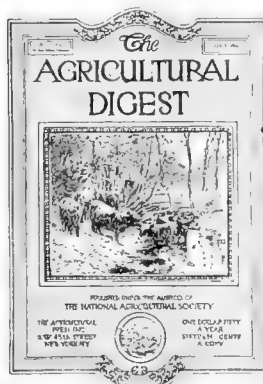
The National Agricultural Society

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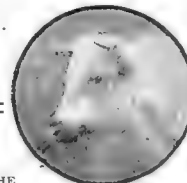
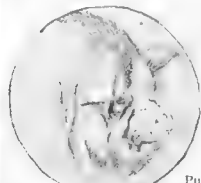


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CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY,
CANADIAN SOCIETY OF
FOREST ENGINEERS

The better protection of forests from fire is making rapid progress in Canada, and this country promises soon to out-distance its ally to the south. The Province of Manitoba has just passed a very complete act covering the whole subject of forest and prairie fires and putting into effect the permit system. The Canadian Forestry Association has been active and instrumental in the passage of this legislation and the Province is to be congratulated on coming into the ranks of those who wish to see rational and efficient protection and use of one of the most important of our natural resources. The time is coming when the people will not permit the destruction or wanton waste of property which should be conserved for our lifetime and for our children. When once it is realized that all forest and mineral wealth and also the fertility of agricultural soil is really the property of the nation and therefore of every voter, no office holders will be tolerated who do not administer such property for the common good.

The enforcement of the new Manitoba act will be carried out by Mr. Mulloy, who is proceeding to organize his fire wardens and rangers for the summer's work. He will coöperate with the Dominion Government fire rangers working on the reserves.

Mr. Robson Black, Secretary of the Canadian Forestry Association, is on a trip through the West in the interest of more general diffusion of knowledge about our forest resources and of better fire protection. He will call on all Government officials interested in such work and will lecture before Boards-of-Trade, Canadian Clubs and other public bodies.

The St. Maurice Forest Protective Association is trying to arrange for a test of an aeroplane for locating forest fires, and if this proves successful it hopes to introduce the aeroplane as a part of its mechanical equipment. There seems no reason to doubt that such a patrol would be much cheaper and more effective than the present ranger system, and if it should prove possible to land near a fire and extinguish it without calling for additional labor, the cost of fire protection would be very materially decreased.

A meeting was held recently in Montreal for the formation of a Montreal section of the Imperial Aero League and the question of the employment of these machines in commercial work of all kinds was discussed. Many aviators will be free after the war and they could be employed in carrying fast mail in forest fire protection and many other services.

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the Crown lands of the Province of New Brunswick has now progressed to an extent where many interesting and instructive conclusions may be drawn from the results already accomplished. To date the field parties have surveyed and examined 550,000 acres. Of this the mapping and compiling of 371,000 acres has been completed.

A letter received from one of the Staff Sergeants of the Canadian Forestry Corps says, "All the forestry battalions have been fused into a Corps, and in addition constant reinforcements are being drafted into it from the medically unfit of the infantry. The Corps is at present about five thousand strong, of whom 1500 are operating in France, and increasing every day. There are about twenty camps in England and Scotland. One Branch at Headquarters is called the Forestry Branch and this handles the technical forestry work and also all lumber returns. Captain Weir, a graduate of Ontario Agricultural College, McGill and Cornell, is in charge, and Sergeant Bricker, a student from Toronto Forest School, is his Assistant. Men in the field were given the title of Forestry Representatives and handled several camps each, sending in general forestry reports embracing silvical studies, soil studies, growth studies, etc., as well as reports on progress, accompanied by maps. Several Toronto men were on this work. Our rank was the high and lofty one of full private except Parker, who was a sergeant before this work was started. He has recently gone to France where he will be associated with the lumbering end of the work, I believe. At present we are planning some new

work at the instigation of the British Forestry authorities. A party is to be sent out to visit all our camps making volume and increment tables. We are going to use the forms which were used at Toronto University for stem analysis and volume tables. This is going to be very valuable experience for us and our time spent as soldiers will not be wasted. Since the British authorities think that this is necessary, we can assume we are 'doing our bit.' There is a very serious shortage of timber, accentuated by the submarine blockade and all production work is being speeded up. The forestry exponents are using their influence to see that the government takes up the question of reforestation as soon as possible, some even advocating that this be commenced before the end of the war."

In Prince Edward County, Ontario, where the removal of the forest exposed a sandy soil, this has drifted and people picnicking in the woods at the edge of this desert amuse themselves by tobogganing down the sandy slopes.

A new idea in fire warning signs is being used in British Columbia and Quebec. Sign posts are put up on the trails and carrys giving the distances with the warning "Put Your Camp Fire Out."

The Canadian Society of Civil Engineers at a recent meeting put themselves on record as heartily in favor of proper forest protection and conservation.

The mobilization of all the resources of the country for the better carrying on of the war has given added impetus to the forestry propaganda and the National Committee on Scientific Research will include forestry research work on its program.

BOOK REVIEWS

An Uncensored Diary, by Ernesta Drinker Bullitt, 205 pp. Price, \$1.25. Doubleday, Page & Co., New York.

Perhaps one of the most interesting accounts of life and everyday conditions in the Central Empires during the present war period is that written by Ernesta Drinker Bullitt and incorporated in book form under the title of "An Uncensored Diary," from the press of Doubleday, Page & Company. Mrs. Bullitt is the wife of William C. Bullitt, and daughter of Dr. Henry S. Drinker, president of Lehigh University. When her husband, who is a newspaper man, was ordered to the battlefields of Europe by the Philadelphia *Ledger* last year, Mrs. Bullitt insisted upon accompanying him. Floating mines or submarines held no terror for her. She was dined by many of the greatest men and women in Germany, Belgium, Austria and Hungary, and without any thought of their future publication, recorded her experiences daily. The diary is particularly unique in that it portrays a condition of affairs as written within the borders of warring nations, and was passed by the censor of the Foreign Office in Berlin.

Mrs. Bullitt frequently was a guest of General von Bissing, governor of Belgium, and also of Baroness von Bissing in Berlin. The one supreme thought of the General and his wife, Mrs. Bullitt explains, is for the safety of their eldest son, who, taken prisoner by the French, was subjected to severe treatment because of alleged ill-treatment accorded the son of Delcassé by the Germans. Von Bissing, she writes, sympathizes greatly with the Belgians.

While in Berlin Mrs. Bullitt dined on numerous occasions with Ambassador Gerard, and when her husband visited the Foreign Office to interview the Under-Secretary of State, Zimmermann, she was along. The German statesman was genial and laughingly cordial to the American woman, explained Germany's ideals and plans, and Mrs. Bullitt treats the meeting with much interest in her book.

Describing the food condition in the various cities and towns visited, the author evokes much interest by her droll humor and alternating tragic treatment of the subject. Touching on the trials and pathetically helpless position of travellers while crossing the different frontiers, she draws a sombre picture not at all conducive to cheerfulness on the part of one who may contemplate a trip abroad. And the experiences and sensations of a young German lieutenant back to "civilization" from the trenches is worthy of note, for Mrs. Bullitt has projected into the character a semblance of humanness which appeals to the individual with "nerves." This young officer, accustomed to shrieking shells and bursting bombs, obnoxious gases and wet trenches, became very nervous if riding in

an automobile, and a tramcar crossing a street at the same time was too terrifying a thing to be borne. All through the book may be found meat for thought, while in various chapters wholesome humor and delightful comedy hold the attention.

Scott Burton, Forester, by Edward G. Cheyney. D. Appleton & Company, New York. \$1.35.

A combination of a forestry education with fighting forest fires, chasing poachers, trapping bears, canoeing and all the ups and downs of college life in a big University, makes Scott Burton, Forester, mighty good reading, especially for a young fellow with a college life before him and a love of the outdoors. Scott, a tenderfoot from the East, goes West to the Forest School of the University of Minnesota to prepare for his chosen life work. He soon learns that there is a tremendous difference between the training he received in the East for his profession and that which the western boy gets, and works hard to overcome his handicap. He does well in his work and achieves great popularity among his fellows which almost turns his head. His solution of that situation is interesting. The book contains a wealth of authentic forestry information, in addition to being a mighty readable story, which gives it a double value.

The Bird Study Book, by T. Gilbert Pearson. Doubleday, Page & Co., New York. Price, \$1.25.

Mr. Pearson, as secretary of the National Association of Audubon Societies, is nationally known as an authority on birds. In this book he aims to present information for the consideration of that steadily growing number of Americans who wish to acquire greater familiarity with the habits and activities of wild birds. The book is intended for the beginner in bird studies. It is plentifully illustrated and will be found of great value to those desiring a knowledge of bird life in this country.

Forest Working Plans, second edition, by A. B. Recknagel. John Wiley & Sons, New York. Price, \$2.00.

The welcome accorded the first edition and the steady demand for it has encouraged the author to compile a revised and enlarged second edition. The book presents that which is best in European forest organization which is adaptable to the present methods of American forestry. The book is of particular value not only to the student but also to the practical forester.

Essentials of American Timber Law, by J. P. Kinney. John Wiley & Sons, New York. Price, \$3.00.

The book is devoted to a presentation of the existing law governing trees and their products as property, with such observations and references to historical development as are considered necessary to an understanding of the reasons for existing law.



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CURRENT LITERATURE

MONTHLY LIST FOR APRIL, 1917

(Books and periodicals indexed in the library of the United States Forest Service.)

Forestry as a Whole

Hutchins, D. E. A discussion of Australian forestry, with special reference to forestry in Western Australia, the necessity of an Australian forest policy, and notices of organized forestry in other parts of the world; together with appendices relating to forestry in New Zealand, forestry in South Africa, and control of the rabbit pest. 434 p. pl., maps. Perth, West Australia, 1916.

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Our Trees

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Forest Protection

Insects


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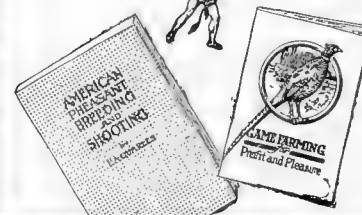
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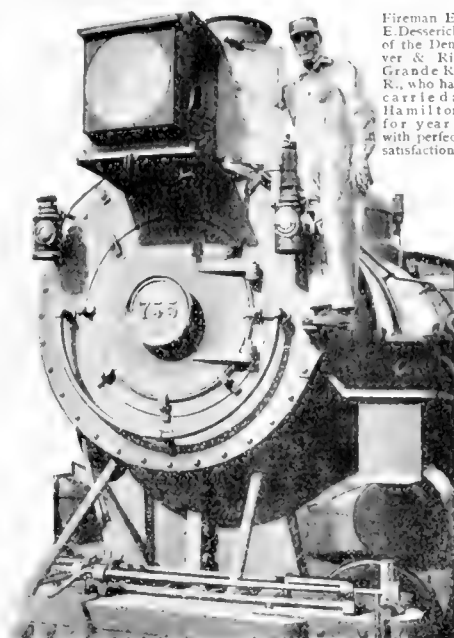
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UNDER-GRADUATE courses in Technical Forestry, Paper and Pulp Making, Logging and Lumbering, City Forestry, and Forest Engineering, all leading to degree of Bachelor of Science. Special opportunities offered for post-graduate work leading to degrees of Master of Forestry, Master of City Forestry, and Doctor of Economics.

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State Forest Camp of three months open to any man over 16, held each summer on Cranberry Lake. Men may attend this Camp for from two weeks to the entire summer.

The State Forest Experiment Station of 90 acres at Syracuse and an excellent forest library offer unusual opportunities for research work.

Yale University Forest School

NEW HAVEN, CONN., U. S. A.

YALE University Forest School is a graduate department of Yale University. It is the oldest existing forest school in the United States and exceeds any other in the number of its alumni. A general two-year course leading to the degree of Master of Forestry is offered to graduates of universities, colleges and scientific institutions of high standing and, under exceptional conditions, to men who have had three years of collegiate training, including certain prescribed subjects. Men who are not candidates for the degree may enter the School as special students, for work in any of the subjects offered in the regular course, by submitting evidence that will warrant their taking the work to their own advantage and that of the School. Those who have completed a general course in forestry are admitted for research and advanced work in Dendrology, Silviculture, Forest Management, Forest Technology, and Lumbering. The regular two-year course begins the first week in July at the School camp near Milford, Pennsylvania.

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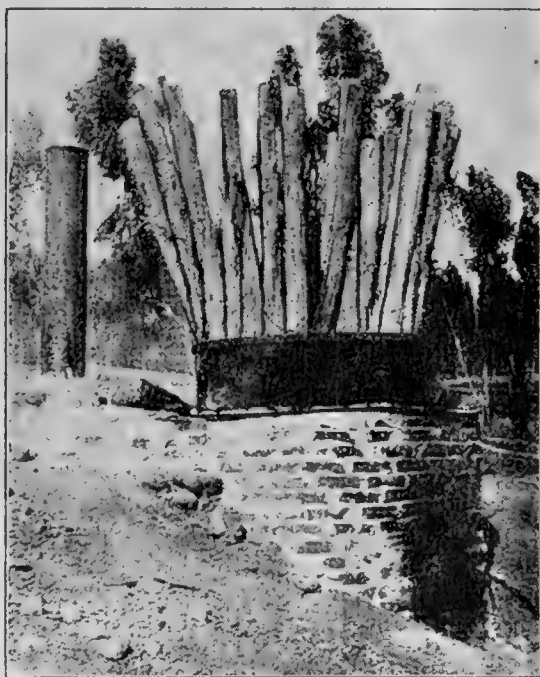


Creosote is Creosote, *but—*

WE sell crude commercial creosote—millions of gallons of it—but we only recommend it for use in the Pressure Process. Green lumber or timber cannot be effectively creosoted by non-pressure processes. They should be air-dry. The OPEN-TANK SYSTEM and the BRUSH METHOD require a *refined* coal-tar creosote. The physical characteristics of the commercial creosotes make them unfit for practical use in these treatments.

Refinement consists of chilling the crude creosotes, solidifying the naphthalene and removing it, draining off the remaining liquid, and distilling it to rigid specifications drawn to meet the special requirements of the Brush Method and Open-Tank System; obtaining an oil liquid at low temperature, penetrating the wood easily, of high preservative value, and positively permanent—*i.e.*, practically non-volatile. For the protection of consumers against the misuse of the phrase “refined creosote,” we have named our refined creosote “Carbosota—Grade-One Liquid Creosote Oil.”

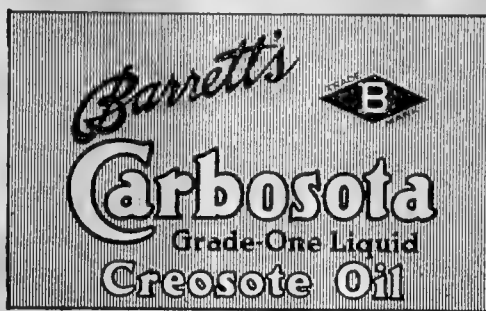
CARBOSOTA, however, is simply a pure coal-tar creosote oil, refined for the purpose, conforming to standard specifications, and *not* a proprietary product or a patented compound.



*Open Tank—Direct Heating.
(Courtesy U. S. Forestry Service.)*



Brush Method



The National Lumber Manufacturers' Association, in their Farm Bulletin, No. 3, state the following:

“Proprietary or patented preservatives consisting of chemical solutions or mixtures of various kinds have been extensively sold. Some of them, particularly those containing creosote, have a high value as preservatives.

Others are practically worthless despite extravagant claims. The high cost is the worst drawback to patented preservatives of merit. They are rarely superior to good creosote and often not as good, and their cost is often out of proportion to their relative value.”

The United States Department of Agriculture, in Bulletin No. 744, says:

“It [coal-tar creosote] is considered one of the most efficient preservatives against decay so far developed.”

COAL-TAR CREOSOTE has been used for the preservation of wood from decay for nearly four-score years.”

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American Forestry



An Illustrated Magazine about Forestry and
Kindred Subjects Published Each Month
by the American Forestry Association
Washington, D.C.

CREOSOTED FENCE-POSTS ARE ECONOMICAL



These ash posts were treated with Creosote in 1905, and when photographed in 1914 showed absolutely no decay. Experts believe they will last 15 to 20 years longer.—Photos courtesy Iowa State College of Agriculture

RAILWAYS and other large industrials use thousands of fence-posts annually, but few are protected from decay, with the result that replacements are continual. An enormous saving in labor and materials can be effected if creosoted posts are used.

The Iowa State College of Agriculture have made a comprehensive study of this subject and the results are published in Bulletin No. 158, from which the following data and quotations have been taken.



Untreated. These cedar posts were set in 1905 and taken up for examination in October 1914. In each case the sap-wood was entirely gone; in post No. 1 about one-third of the entire post had decayed; in post No. 2 one-half of the bottom decayed, while in post No. 3 more than one-half of the bottom decayed.

ESTIMATED AVERAGE LIFE IN YEARS

Species of Wood	Untreated	Creosoted
Ash	6 years	25 years
Cottonwood	3 years	25 years
Red Oak	6 years	20 years
White Cedar	14 years	30 years
Willow	4 years	25 years

Further interesting facts are quoted from Bulletin mentioned above:

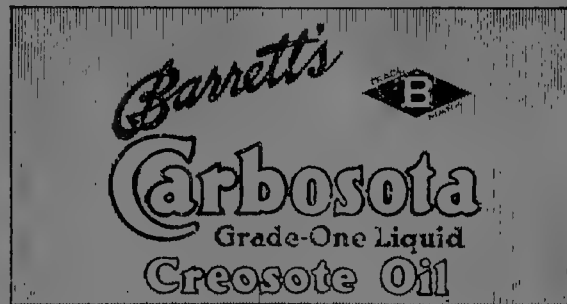
First—"By effective creosote treatment it is probable that woods commonly used for posts may be doubled in life (white cedar, oak, etc.)."

Second—"By treatment many species at present almost valueless can be made to last twenty-five years or more, with only a small addition in cost for treatment (willow, soft maple, cottonwood, elm, etc.)."

Third—"Figuring the investment at 6% simple interest, creosoting reduced the annual cost of the less durable fence-posts by about one-half."

Fourth—"In selecting posts for treatment take the native soft-wooded trees and save the oak, hickory, black walnut, etc., for other purposes."

Fifth—"In creosoting select small posts, those 4½ inches in diameter, if of sufficient strength. They are cheaper and when creosoted will last as long, or longer, than seven-inch posts."



Sixth—"See that the posts are thoroughly peeled of the inner as well as the outer bark."

Seventh—"The posts should be thoroughly seasoned before treatment is attempted, or a poor penetration of creosote oil will be secured."

The Best Creosote for all practical purposes is Barrett's Carbosota—Grade-One Liquid Creosote Oil.

It comes ready for use in convenient-sized packages and requires no apparatus or skilled labor for its application. Any one can use it properly at any time.

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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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JUNE 1917 VOL. 23

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One of the following described books will be presented free of charge to any member of the American Forestry Association who secures ONE NEW subscribing member:

- No. 1—Field Book of American Trees and Shrubs, 465 pages, 275 illustrations of trees, leaves, blossoms, fruits, seeds, area of growth, etc.
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AMERICAN FORESTRY is published monthly by the American Forestry Association.

Subscription price without membership, three dollars per year; single copies, twenty-five cents.

Entered as second-class mail matter December 24, 1909, at the Post-office at Washington, under the Act of March 3, 1879

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REAL ESTATE



RED OAK

SOUTH CAROLINA TIMBER

Timber on a South Carolina plantation or **entire plantation**, on the Great Pee Dee River in Marlboro County. Now occupied and under cultivation. Dwelling house occupied by owner. Several new small houses rented to colored help, barn, small saw mill. 1,140 acres cleared. 3,200 acres timbered; 1,250 acres fine large old growth timber, 700 acres large second growth timber over 50 years old; balance mostly thrifty, large second growth timber. Growth of Gum Pine, etc., very rapid. Many very large White and Red Oaks, Yellow Pine, Cypress, Sycamore, Cottonwood, Holly, etc., as shown in accompanying photograph.

A careful estimate shows the following:

BOARD FEET	VARIETY
6,770,000	Sweet Gum
3,520,000	Yellow Pine
1,680,000	Red Oak
1,560,000	White Oak
1,000,000	White Ash
790,000	Hickory
680,000	Sycamore
670,000	Maple
560,000	Elm
460,000	Cottonwood
390,000	Black Gum
390,000	Cypress
100,000	Holly
60,000	Birch
30,000	Willow
250,000	Other species
18,910,000	Total

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Location and Amount All the merchantable dead timber standing or down and all the live timber marked or designated for cutting on an area embracing about 1580 acres in Township 5 N., R. 7 E., W. M. unsurveyed, Wind River watershed, Columbia National Forest, Washington, estimated to be 70,000,000 feet B.M., more or less, of Douglas fir, western hemlock, western red cedar, western white pine, amabilis fir, grand fir, and other species, approximately 64 per cent Douglas fir.

Stumpage Prices Lowest rates considered, \$1.40 per M for Douglas fir and western red cedar, \$3.00 per M for western white pine, and 50 cents per M for western hemlock, amabilis fir, grand fir, and other species.

Deposit With bid \$5000, to apply on purchase price if bid is accepted, or refunded if rejected. Ten per cent may be retained as forfeit if the contract and bond are not executed within the required time.

Final Date For Bids Sealed bids will be received by the District Forester, Portland, Oregon, up to and including May 14, 1917.

The right to reject any and all bids is reserved.

Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the

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Forest Engineer

Newbern, N. C.

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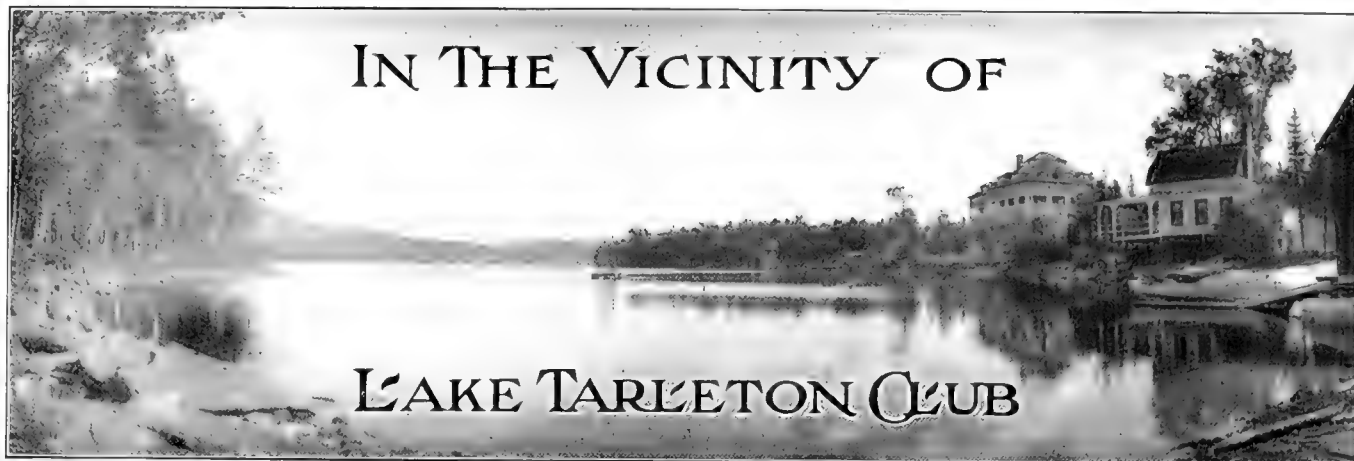
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REAL ESTATE

FORESTS : ESTATES : TIMBERLANDS
PRESERVES : FARMS : CAMPS : ETC.



Do you know that in the State of New Hampshire there are 635 lakes and ponds and over 10,000 miles of rivers? In addition there are thousands of miles of trout streams. The average visitor to the so-called "White Mountain Region" sees but a fraction of these lakes and streams. They compose the real beauty of New Hampshire scenery and they lie but a short distance from the main travelled boulevards of the State, most of them south of the Presidential Range.

The picture at the top of this page is a glimpse of one end of Lake Tarleton, in the Lake Tarleton Club preserve of 5000 acres. There are five lakes and over three thousand acres of forest in this preserve. Within a radius of fifteen miles from Lake Tarleton Club House are forty lakes and ponds and over ninety streams. All this delightful wilderness of lake and forest is absolutely secluded and yet within twenty minutes' automobile drive of express trains from New York and Boston. It is four hours nearer New York City than the chief resorts of the Adirondacks.

Own several hill farms within a few miles of this delightful resort which command unsurpassed views of lake and mountain and are ideally situated for summer homes, for fish and game preserves, or for practical self-supporting

farms. Most of them are well-timbered and were purchased because of scenic and timber values. Several of them have trout brooks and lake area within their boundaries and sufficient timber growth to repay the purchase price if properly handled. I will sell these at favorable prices and terms to parties wishing to establish summer homes or to follow practical forestry methods in protecting the timber growth. Larger timbered areas can be procured in the neighborhood of several of them if desired.

I own several timber tracts in New Hampshire and Vermont, without farms, varying in size from 100 to 2500 acres, well covered with spruce, pine, and hardwood growths suitable either for saw mill or pulp operations.

I also have for sale a 5000-acre tract of second growth yellow pine in Jefferson and Grant Counties, Arkansas, about ten miles west of the City of Pine Bluff. There are estimated to be twenty-five million feet of yellow pine and several million feet of oak and red gum on this tract.

Prices and fuller information furnished on request to parties seriously interested.

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PIKE, NEW HAMPSHIRE.



SALE OF TIMBER FLATHEAD INDIAN RESERVATION

SEALED BIDS MARKED OUTSIDE "BIL Flathead Timber, Ronan Unit" and addressed to Superintendent of the Flathead Indian School, Dixon, Montana, will be received until twelve o'clock noon, Mountain time, Tuesday, September 11, 1917, for the purchase of the merchantable timber upon tribal and allotted lands situated within Sections 4 and 5 T. 19 N., R. 19 W.; Sections 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 32, 33, and 34 T. 20 N., R. 19 W.; Section 21, 22, 27, 32, 33, and 34 T. 21 N., R. 19 W.; Section 1 and Section 12 T. 20 N., R. 20 W. M. P. M. containing approximately 57,000,000 feet of timber, over 80 per cent Western Yellow Pine. Each bid shall state the amount per thousand feet B. M. offered for Yellow Pine (including "bull pine") and the amount per thousand feet offered for Fir, Larch and other species. Each bid must be submitted in triplicate and be accompanied by a certified check on a solvent national bank, drawn in favor of the Superintendent of the Flathead Indian School, in the amount of \$2500. The deposit will be returned if the bid is rejected, and retained as a forfeit if the bid is accepted and the bond and agreements required by the regulations are not furnished within 60 days from the date when the bid is accepted. No bid of less than \$3 per thousand feet for Yellow Pine and \$1.25 per thousand feet for Douglas Fir, Larch and other species will be accepted. The right to reject any and all bids is reserved. Copies of regulations and other information regarding the proposed sale including specific description of the sale area may be obtained from the Superintendent of the Flathead Indian School, Dixon, Montana.

Washington, D. C., May 4, 1917. CATO SELLS, Commissioner of Indian Affairs.

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The fact that you are taking this paper is evidence that you are interested in Timber. Would you like to get a piece of land of your own that has part timber and that may be used for home all of the time or part of the time or when you may need it? For information and particulars about how to take 40 to 160 acres of timberland without residence, direct from officials, write **JOSEPH CLARK**, Searcher of Records, Sacramento, California.

BUSINESS FOR SALE

AN OPPORTUNITY for some rich man's son, in a profitable out of doors occupation. I will give three months of my time to teach the purchaser—renovating old orchards, tree surgery, spraying and moving large trees. Lots of orders on hand. Present owner is classed as one of the most expert in Massachusetts. Situated near 300,000 people. Included in the sale will be automobiles and sprayers, tools and a great many books on forestry, etc. For further information address Box 400, care of **AMERICAN FORESTRY**.

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AMERICAN FORESTRY

VOL. XXIII

JUNE 1917

NO. 282

A FORESTRY REGIMENT IN ACTION

"SOMEWHERE in France," a full regiment of trained American woodsmen will soon be at work aiding the cause of the Allies. The United States Forest Service, at the request of the War Department, prepared plans for the organization and is recruiting the men. These men form a part of the Engineers' Reserve Corps, organized for special duty behind the battle lines on the Western front and the units of which are going into service as fast as they can be equipped. The speed and efficiency which have characterized the formation of this regiment give evidence of the wholehearted and thorough way the American people are "coming across," now that they have been drawn into the titanic struggle against the enemies of democracy. Swift and sure American business methods can be counted on to do the will of the people with dispatch.

A few days after President Wilson's proclamation that a state of war existed between the United States and Germany, a census of the trained foresters and woodsmen of the country was begun by the United States Forest Service in conjunction with state forestry boards and forest protective associations all over the country. The purpose was double, it being considered as necessary to furnish adequate protection for the forests of the country as to furnish men to serve the nation's need in military organizations. The men were urged to refrain from rushing into military organizations without giving consideration to the question as to what they were best fitted to do. As a result the special abilities of these men were not lost through random enlistment and are now available to fill the urgent need which our Allies, through Mr. Balfour, of the British Commission, inform us exists and ask us to meet.

The regiment is organized in units capable of handling all kinds of woods work, and includes a number of portable sawmill outfits and complete equipment for every phase of a lumbering operation. It will be officered by trained foresters and expert lumbermen who are thoroughly familiar with producing and delivering lumber. The Forest Service is exercising great care in selecting the men, striving to get the most skilful workers in the several specialized lines of woods and mill work, and it is stated

that this will be the finest body of experts that it is possible to gather. The classes of men in the ranks comprise axemen, teamsters, skidders, loaders, scalers, tie-hewers, millwrights, saw-filers, sawyers, engineers, portable sawmill men, blacksmiths, lumberjacks, and carpenters, as well as motorcycle and motor truck operators. In addition, there are a number of cooks, commissary experts, clerks, etc., for maintaining the large camps necessary in connection with the woods operations.

Although the regiment is organized by the Forest Service and officered by forestry experts who have received their training in Government or State service, the supreme command is in the hands of an army officer appointed by the War Department and the entire regiment is organized on the military plan and is under military law.

The men are furnished with the regular army uniforms, a necessity in the war zone in order to insure their treatment as prisoners

of war in case of capture by the enemy. Every man has enlisted in the regiment for four years, but active service will be required for only such part of that period as may be necessary. The rules for enlistment require that a man be between the ages of eighteen and forty-five, be a citizen of the United States or have declared his intention to become such, be physically sound and pass the regular military physical examination.

Pay of enlisted men, as well as officers, begins at date of enlistment, and traveling expenses from the place of enlistment to the training camp are met by the Government. The salaries of officers are the same as those received by officers of corresponding rank in other branches of the military service, while those of enlisted men are as shown in table on following page.

The regiment is made up of six companies of 164 men each, with twenty-six men on the battalion and regimental staffs and a driver for each vehicle, in addition to the commissioned officers. The enlisted men will include: six first sergeants, 18 sergeants, first-class, 1 sergeant bugler, 50 sergeants, 6 stable sergeants, 6 supply sergeants, 6 mess sergeants, 2 color sergeants, 19 cooks, 6 horse-shoers, 108 corporals, 6 saddlers, 27 wagoners, 186 pri-



FOREST REGIMENT FLAG

The proposed flag for the regiment of United States expert woodsmen, which will soon be seen in France.

vates, first-class, 558 privates, second class, 12 buglers. It is being mobilized in six companies, three being trained at the engineering training camp at Fort Leavenworth, Kansas, and the other three at American University, Washington, D. C.

SALARIES OF ENLISTED MEN

Grade	Monthly pay in U. S.	Monthly pay Foreign service
Master engineer, senior grade	\$81.00	\$97.20
Master engineer, junior grade	71.00	85.20
Regimental sergeant major	51.00	61.20
Regimental supply sergeant	51.00	61.20
Battalion sergeant major	51.00	61.20
Battalion supply sergeant	51.00	61.20
Sergeant, first-class	51.00	61.20
Sergeant bugler	48.00	57.60
Sergeant	44.00	52.80
Stable sergeant	44.00	52.80
Supply sergeant	44.00	52.80
Mess sergeant	44.00	52.80
Color sergeant	44.00	52.80
Cook	38.00	45.60
Horseshoer	38.00	45.60
Corporal	36.00	43.20
Saddler	36.00	43.20
Wagoner	36.00	43.20
Private, first-class	33.00	39.60
Private, second-class	30.00	36.00

Listing of applicants for service in the regiment is in the hands of the following forest officers. This listing does not insure final acceptance of the applicant, as it may be necessary to reject some of the men listed for physical defects or for other reasons:

F. H. Colby, Forest Commissioner, Augusta, Maine; J. S. Benedict, United States Forest Service, Gorham, New Hampshire; E. C. Hirst, State Forester, Concord, New Hampshire; Harris A. Reynolds, 4 Joy Street, Boston, Massachusetts; W. O. Filley, State Forester, New Haven, Connecticut; C. R. Pettis, superintendent of State forests, Albany, New York; J. S. Illick, Pennsylvania Department of Forestry, State Forest Academy, Mont Alto, Pennsylvania; F. W. Besley, State Forester, Johns Hopkins University, Baltimore, Maryland; H. L. Johnson, United States Forest Service, Elkins, West Virginia; S. H. Marsh, United States Forest Service, Harrisonburg, Virginia; Verne Rhoades, United States Forest Service, Asheville, North Carolina; H. G. Spahr, United States Forest Service, Blue Ridge, Georgia; E. P. Bushnell, United States Forest Service, Johnson City, Tennessee; Edmund Secrest, State Forester, Wooster, Ohio; T. B. Wyman, Munising, Michigan; W. T. Cox, State Forester, St. Paul, Minnesota; G. E. Marshall, United States Forest Service, Cass Lake, Minnesota; F. B. Moody, Conservation Commissioner, Madison, Wisconsin; J. H. Foster, State Forester, College Station, Texas; The Forester, United States Forest Service, Washington, D. C.; District Forester, United States Forest Service, Federal Building, Missoula, Montana; District Forester, United States Forest Service, New Federal Building, Denver,

Colorado; District Forester, United States Forest Service, Gas and Electric Building, Albuquerque, New Mexico; District Forester, United States Forest Service, Forest Service Building, Ogden, Utah; District Forester, United States Forest Service, 114 Sansome Street, San Francisco, California; District Forester, United States Forest Service, Beck Building, Portland, Oregon.

The duty of this regiment will be the cutting of timber and its manufacture into the forms needed for military use. Railroad ties will be produced in large quantities for repairing the French railroads. Military use, coupled with a lack of men available for railroad work, has resulted in rapid deterioration of the railroads leading up to the front. A good deal of the timber cut will be used for bridge construction and large quantities must also be produced for trench timbers. The arts of peace must be pushed, too, in order to make successful prosecution of the war possible, so a good deal of lumber will be produced for building operations as well as for mine props and cordwood.

The location of the field of operations is not made known for military reasons. The work will be done, however, in the French forests of oak, beech, hornbeam and other hardwoods, with occasional stands of pine. The timber in these areas is small in comparison with that of most American forests, much of it being only eight to twelve inches in diameter. In character these lands are much like the woodlots of Southern New England, and on the whole the operations will be similar to portable sawmill logging in Massachusetts, Connecticut, Maryland, and Virginia.

France has managed her forests scientifically for a great many years, using them on the permanent, sustained yield basis. Although the exigencies of the war put the timber needs far above the yield, every possible means will be used to reduce waste to the absolute minimum and thus preserve as much of the forest as possible for future production. The American regiment will therefore be called upon not only to turn out the lumber at high speed, but to do it with high efficiency as well. The condition of the forests after the selective cutting operation has been completed will tell more plainly than words how well the American woodsmen know their business. The personnel of the regiment allows no doubt that the work will be done thoroughly and with speed, as well as on correct scientific principles.

As the magazine goes to press, the Forest Service announces that it is prepared to organize one or more additional regiments if they are needed. Indications are that more will be needed, and in that case the men will be recruited as soon as the organization of the first regiment is completed. Since the first announcement of the organization of this body of expert woodsmen was made, the offices of the Forest Service and the American Forestry Association have been flooded with inquiries and applications from every section of the country. The eagerness of the men to serve makes it certain that as many regiments as are needed will be recruited without delay.

So a considerable part of America's part in the war will be an intensive application of the principles of civilization, conservation and construction.

SAWMILL UNITS FOR ENGLAND'S NEED

ALMOST immediately after the entry of the United States into the European war an opportunity was afforded for American forestry and lumber interests to give practical example of American enterprise and efficiency in extending substantial aid to our allies overseas.

In no individual instance, perhaps, will the helpful activity of this country be better illustrated than in the extension of assistance to the British Government in the solution of serious problems involving timber supply for its forces in France. The response to the English need was given with a swiftness and efficiency characteristic of the American forester and lumberman. No time was wasted and there was no lost motion in achieving tangible results. The whole thing was worked out within 24 hours and the machinery placed in action to make the contribution immediately effective.

The British need was for skilled lumbermen and equipment. Because of a lack of these factors the forces in France were seriously handicapped. Knowledge of this condition came to the Massachusetts Committee on Public Safety and it was immediately realized that the only way in which effective assistance could be given was through sending men and equipment direct to England. Inadequate shipping facilities made it impossible to send the lumber itself. For this reason it was proposed that New England raise ten portable sawmill and logging units and turn them over to the British authorities.

The proposal was at once cabled to London. Through the British Embassy at Washington a cablegram was received from the War Office indicating pleased acceptance of the offer and stating that transport facilities would be provided by the British Government. The project received the unofficial approval of Secretary of War Baker and the enthusiastic and active coöperation of the Governors of all the New England states.

To work out the details of the undertaking and to make its operation effective the Massachusetts Committee on Public Safety appointed a committee of which the chairman was W. R. Brown, of Berlin, New Hampshire, a director of the American Forestry Association and a member of the Lumber Committee of the Council of National Defense. Mr. Brown is also president of the New Hampshire Timberland Owners' Association. The other members of the committee were.

James J. Phelan, Vice-Chairman, Massachusetts Committee on Public Safety; Harold G. Philbrook, Treasurer, Vice-President, Connecticut Valley Lumber Company; F. W. Rane, Secretary, State Forester of Massachusetts; George S. Lewis, Treasurer, Connecticut Valley Lumber Company; Philip T. Dodge, International Paper Company; H. W. Blanchard, H. W. Blanchard Lumber Company; Garrett Schenck, Great Northern Paper Company; Hon. Herbert B. Moulton, Parker and Young Company; I. B. Hosford, St. Croix Paper Company; Martin A. Brown, Woodstock Lumber Company; George E. Henry, J. E. Henry and Sons; Samuel H. Boardman, President Eastern

Shook and Wooden Box Association; J. M. Parker, St. John Lumber Company; Marshall T. Wood, Lande Manufacturing Company; H. B. Stebbins, H. B. Stebbins Lumber Company; Chester C. Whitney, Perry Whitney Lumber Company; J. H. Hustis, Receiver, Boston and Maine Railroad; L. S. Tainter, Conway Lumber Company; E. C. Hirst, New Hampshire State Forester; Forest H. Colby, Maine State Forester; W. O. Filley, Connecticut State Forester; J. B. Mowry, Rhode Island State Forester.

It is significant of the scope and influence of the American Forestry Association that of the 23 members of this committee twelve are members of the Association. This representation includes, in addition to Chairman Brown, Messrs Philbrook, Rane, Dodge, Blanchard, Martin A. Brown, Henry, Tainter, Hirst, Colby, Filley and Mowry. On subcommittees appointed for handling details the American Forestry Association was represented by Blaine Viles and W. J. Lannigan.

An idea of the speed and effectiveness of the committee's work is given in the statement that the first meeting was held on May 17 and that within less than a week formal announcement was made of complete readiness. The men and equipment were sent to England very soon afterwards. In this promptness of action and in the perfection of organization the undertaking has shown our allies that American coöperation in the European war is to be fully depended upon to meet emergencies as they may arise.

To send ten units for sawmill and logging operations in England involved the raising of a fund of \$120,000. The cost of each unit is placed at \$12,000. This money was provided overnight. Through its Governor and its committee on public safety each of the New England states subscribed the sum required for a single unit. With six units thus provided for, there was no difficulty in raising funds for the four remaining units by private subscription among the paper manufacturers, lumbermen and timberland owners of New England. Because of these contributions, as well as because of the fact that almost the entire membership of the committee is made up of timber owners and foresters, the sawmill and logging units are identified as the gift of the New England timber interests to the British Government.

The thoroughness with which the committee worked out the details of the enterprise is indicative of the spirit with which the whole matter was undertaken. In submitting the plans Chairman Brown presented six closely typed pages showing the exact requirements of each unit. These needs included everything that would be wanted in a sawmill and logging camp, from a portable 50 or 60 horsepower engine and boiler, a rotary sawmill which can saw up to 20-foot lengths, four saws, 2000 extra teeth, to an exact specified number of each of the hundreds of spare parts, mill supplies and tools and articles needed for felling equipment, hauling equipment, construction and repair equipment and camp equipment. This exactness extended even

to three dozen lamp wicks for each camp, 1½ dozen lamp chimneys, two six-quart bean pots, a couple of can openers, half a dozen salt shakers and the almost countless domestic articles that a camp must have. These things are mentioned as indicating the careful attention given the details by some of the busiest men in New England.

The man-power of the ten units amounts to close to 400. For general supervision there is a general manager, a bookkeeper, an engineer and millwright, a storekeeper and purchasing agent and a secretary and stenographer, and for each camp a timekeeper and bookkeeper. For the logging

crew each unit has 25 men and for the mill crew nine men. Horses to the number of 120 were taken, with harness and stable equipment.

Through the British Embassy arrangements were made that the men should work as civilians, under contract for one year, that their wages should be paid from the time of sailing, that they are to be provided with board, lodging and medical attendance, and transportation to and from England, that they are to be employed only in the United Kingdom and that they are to do logging and millwork exclusively.

WAR, FORESTS AND LUMBER

THE national importance of America's forest resources and the technical skill of her forestry experts have never been so emphasized as by the emergency brought about through this country's participation in the European war. Every phase of the situation is in some way closely interwoven with and dependent on our lumber supply. Without this natural wealth of our forests and the ability to make it quickly available there would be paralysis of our best effort.

Whether it be the need for ships for the transportation of foodstuffs and munitions, the need for the construction of vast camps for the training and concentration of the army or any one of the many activities looking toward armed, industrial and economic preparedness, American lumber is one of the foundations of American participation in the war. Hand in hand with this is the need for the active assistance of men trained in forestry and lumber operations for swiftly, surely and wisely handling the vast supply of lumber that must be utilized. In the present situation this human resource is as vital as the lumber itself.

Through the coöperation of the Federal Shipping Commission and the Lumber Committee of the Council of National Defense the grave problems involving the Government's lumber supply for war-time needs are being reduced to their simplest terms. That the solution will prove adequate there appears to be no room for doubt. The work already accomplished and the program prepared make it clear to those familiar with the situation that the country has been placed in position to meet the emergency in the quickest and most efficient manner.

The Lumber Committee is made up of men representative of the best spirit of the American lumber industry. They are men of vast private interests, who have dropped their own work and submerged their own affairs into an earnest effort to be of service to the nation. Efficiency is the committee's central thought. As to business capacity, thoroughness and expert knowledge, as well as to patriotism, this committee affords exemplification of the extent to which the Government is receiving constructive assistance at the hands of the public-spirited business men of America. In no branch of its work is the Council of Defense being given help that is more vital or more valuable than in connection with forestry and lumber.

THE essence of this country's present helpfulness toward its European Allies in the great war is in the matter of food supply. We have the foodstuffs and we are providing Europe with funds with which to pay for them. To make this combination of merchandise and buying power of definite value the fundamental need is shipping facilities. Through the activities of enemy submarines the available supply of ships has been greatly diminished, and as this destruction proceeds the need for added tonnage becomes greatly emphasized. It is in the effort to help supply this need as swiftly as possible and at the same time provide for the adequate care of the internal needs of our own Government and private enterprise that the Lumber Committee is doing a big work and doing it well.

Lumber is needed by the Government in tremendous quantities. The building of a thousand wooden vessels now being undertaken by the Federal Shipping Commission will require more than 1,000,000,000 feet. Construction of barracks and other building operations of the army and navy will greatly increase the volume needed for public use. In the aggregate the official requirements are creating a sudden and unusual demand for lumber to the extent of approximately 2,000,000,000 feet. In the handling of this tremendous order the expert counsel and planning of Forestry experts and trained lumbermen are essential.

Without this coöperation the Government problem would be intensified and the lumber trade would suffer demoralization. To make such demand for material on an industry normally unorganized, broken up into thousands of unrelated units and widely scattered geographically, would bring about a condition that would seriously hamper the Government in its efforts to meet the emergency. It is to overcome this lack of organization and to bring about coördination that the Lumber Committee has concentrated its efforts.

One of the fundamentals in handling the situation and solving the problem was the application of expert knowledge of forestry. First-hand knowledge of the country's available supply of timber and its accessibility was the thing upon which all the work of the committee must be based. Obviously this intimate information could be furnished by none others than men trained along technical

forestry lines. For this reason it was inevitable that the man-power of the American Forestry Association should be generously drafted into the work of the Council of Defense through its Lumber Committee. This draft has given the Council the benefit of the skill and experience of such individual members of the Association as R. H. Downman, of New Orleans, who was made chairman of the committee; Henry S. Graves, chief forester of the United States and vice-president of the Association, and E. T. Allen, of Portland, Oregon, and W. R. Brown, of Berlin, New Hampshire, directors of the Association. These experts are all members of the committee, as are the following named members of the Association: G. S. Long, of Tacoma, Washington; Charles S. Keith, of Kansas City; C. H. Worcester, of Chicago, and W. H. Sullivan, of Bogalusa, Louisiana. In his work as a member of the committee Forester Graves has the active assistance of William B. Greeley, assistant Forester of the United States, who is a director of the American Forestry Association. On the Federal Shipping Commission the directorate of the Association is represented by Capt. J. B. White, of Kansas City, a recognized authority on Lumber Conservation and utilization. This list indicates the importance of the American Forestry Association's contribution to the national work.

An important result already achieved by the Lumber Committee is in the matter of purchases of lumber for building the big new army cantonments. Through the work of the committee the Government has been placed in position to save from \$3 to \$5 a thousand as against the prevailing market prices in the several sections from which the lumber will be taken. The basis is not one of arbitrary price fixing, but of informal agreements assuring a maximum price varying according to cost of production in different parts of the country and the grades of lumber involved. As the building contractors will be paid a fixed percentage of the cost of construction the Government will reap another direct advantage of the lower lumber cost, making possible a vast saving in addition to that involved in the purchases themselves. The arrangement between the Lumber Committee and the lumbermen is so elastic that it will leave the Government entire freedom of choice in placing orders, while contractors purchasing direct on emergency requirements will have the names of dealers with whom they can deal at Government prices.

THE committee has also concentrated on arranging a proper apportionment of the lumber in the individual cantonment districts so as to avoid waste in transportation. Through improved specifications, a carefully worked out disposition of supply sources and railroad facilities it has been conservatively estimated, according to a bulletin of the Government Committee on Public Information, that the Lumber Committee has already saved the Government at least \$5,000,000 in addition to the saving through price agreements.

It is not only through their forestry knowledge and training but through their familiarity with lumber manufacture and transportation problems as well that these men are giving the Council of National Defense and the Shipping Commission a measure of helpfulness that cannot be computed in dollars and cents. The real gauge of

this assistance will be in the efficiency which it will make possible in prompt meeting of the requirements for lumber and simplification of the problems of distribution, no less than in the money that may be saved to the Government through centralized purchasing and voluntary cooperation on the part of the lumber interests of the country.

One of the primary needs of the situation, as pointed out by the Lumber Committee, is that the Government should adapt its requirements, as far as possible, to existing lumber stocks and manufacturing conditions, to the end that delays may be prevented, cost minimized and the best possible output achieved. Another basic need is the prevention of extreme inflation in prices, which would normally follow such a sudden increase in demand. It is figured that this inflation might readily increase the cost of the lumber needed for public use to the extent of \$5,000,000 or more and at the same time work a hardship on private consumers.

CAREFUL handling of transportation is another vital point in the situation. The Committee recognizes the importance of eliminating cross-shipments of lumber, doing away with unnecessary long hauls and in every way holding transportation cost to a minimum. It is pointed out that transportation charges might easily be increased 25 per cent or more by the haphazard placing of orders, and that this increased expenditure would be incidental to the general loss involved in a failure to achieve the maximum use of the country's transportation facilities.

Correlation of the requirements of the various Departments and the needs for different classes of lumber is another point to which the Committee has given careful attention. This calls for systematic planning as far in advance of deliveries as may be possible. In order that available stocks may be best utilized and lumber manufacture best adapted to the products to be needed by the Government it is deemed necessary that all requisitions be brought together and orders placed, as far as practicable, with regard to the whole list rather than individual items. One example of the application of this method is to be found in the plan that the large volume of small dimension lumber and boards necessarily produced in manufacturing ship timbers for the emergency fleet should be used as far as possible in the construction of cantonments and other purposes for which they may be suited. It is foreseen that unless all public needs for lumber be thus tied together there is certain to be serious delay in supplying some of these needs and a greater or less disruption of normal manufacturing conditions, with resultant decrease of output and increase of cost.

To overcome the various difficulties necessitates cooperation of Government, lumber manufacturers and lumber trade organizations to insure the production of the necessary grades and quantities, stabilize prices and provide for the most direct deliveries. To make this cooperation effective requires that the lumber needs of the Government be brought together at one central point.

In order to accomplish these important objects the Lumber Committee has suggested that it serve as a clear-

ing-house on the lumber requirements of all Government Departments, with a view to centralizing orders and purchases as far as may be practicable. Representing every large lumber producing region of the country, together with the organization and facilities of the United States Forest Service, the committee believes that its services can be best utilized and the Government's lumber requirements most effectively met under a program carefully planned through its deliberations.

The first step in this program calls for submission to the committee by each Department or Bureau, as far in advance of necessary deliveries as possible, of all anticipated lumber requirements of material quantities. These references should include data on proposed use, specifications and time and place of delivery. After consideration of the specifications the Lumber Committee will promptly advise with the Department or Bureau, with a view to adjusting the needs to fit current lumber stocks or manufacturing conditions. Suggestion will be made as to specific commercial grades, based upon the current rules of lumber manufacturers' associations, which will meet the specifications at a minimum cost.

As another step the committee will stand ready to advise the Department or Bureau as to the best manner of making its purchases, either from designated manufacturers or associations known to be in the best position to furnish the materials promptly and at a minimum trans-

portation cost, or from local distributing yards in the case of smaller and emergency orders.

ONE of the most important functions of the committee, as planned, is in the matter of prices. With intimate knowledge of trade conditions and all sources of supply, the committee will be in position to give advice as to the prices at which materials can be procured or as to the maximum prices which it is equitable for the Government to pay. Methods of procedure that will insure the most favorable prices and deliveries at the lowest cost within the time limits necessary will be suggested in each specific instance. Further suggestions will be made, when desirable, regarding methods of inspection and other details that will fully protect the interests of the Government.

The results achieved by the committee will be shown in reports of all its activities, with specific lists of lumber orders placed, and with full information as to prices and terms, filed periodically with the Advisory Commission to the Council of National Defense through the committee on raw materials of which the Lumber Committee is a part.

This outline of the work proposed for itself by the Lumber Committee makes obvious the intent to develop the centralized purchase of lumber required by the various branches of the Government and to avoid the losses and delays which are considered inevitable under decentralized and unsystematic handling of this large volume of business.



Guy E. Mitchell

SANTA CRUZ NATURAL BRIDGE (BEFORE THE DAWN OF LIFE)

One of the most perfect of natural bridges, appearing almost like an artificial tunnel, is found in Santa Cruz County, California. The top of the bridge is used as a driveway, as is shown in the picture. The exposure of the rock made by the natural undercutting of this bridge by the ocean waves beating on the shore discloses to the trained eye an interesting phase of the formation of this part of the country. The lower or darker portion of the rock forming the bridge is shale, young geologically, but of great age as computed in years or centuries. The upper fifteen feet, which, as shown in the photograph, is of lighter shade, was deposited in the age immediately preceding the one in which we live. This surface material was deposited by the rushing streams fed from the great glaciers which lay in the mountains of the Sierra to the east.

LIGNUM VITÆ IN CURAÇAO

BY MILES HAMAN

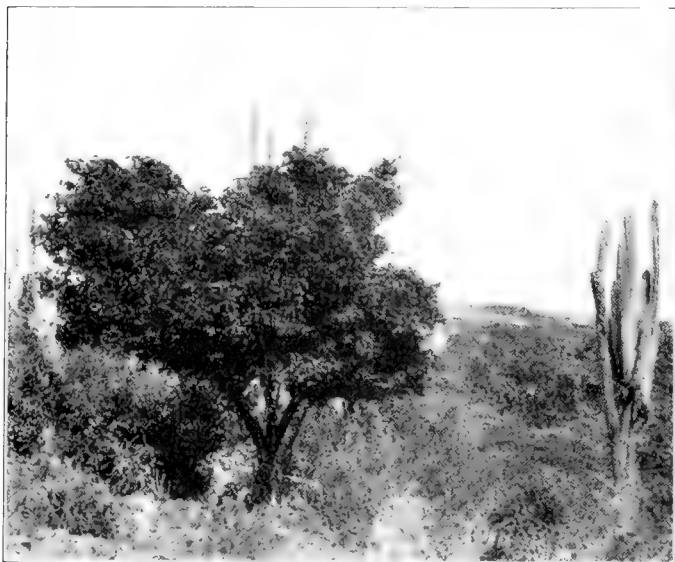
PRACTICALLY every American who is at all familiar with the common commercial woods has seen and handled Lignum Vitæ, or, as it is commonly called from Havana to Buenos Aires, guayacan. To those who are unfamiliar with this wood and its uses, it would be of interest to look closely at the next bowling-ball, pulley-block, or wooden bed-caster and one will be pretty sure to find a close-grained, heavy, green wood with an oily surface which bears, in English-speaking countries, the name of Lignum Vitæ. Though the wood is thus in common use and well known, but few have ever seen the tree in its native surroundings.

There are a number of species, but perhaps the most common are *Guayacum sanctum* and *Guayacum officinale*, of the West Indian Islands. Closely related genera of the same family are found in the Argentine Chaco, where it is a much prized fire-wood of the Indians. Many a soldier and ex-

somewhat moderated by the trade winds, and the island is out of the Caribbean region most affected by hurricanes.

The region is one of extreme drought. The average rainfall is less than ten inches and records of no precipitation at all for an entire year are not uncommon.

Huge tree cacti, *Cereus*, *Opuntia* and *Melocactus*, thorny shrubs and such plants as are common to the Arizona-Cal-



LIGNUM VITÆ, OR GUAYACUM, IN ITS NATIVE SURROUNDINGS
The heat is very great but modified by trade winds and the region is one of extreme drought, the average rainfall being less than ten inches, and records of no precipitation at all for a whole year are not uncommon. The huge cacti and thorny shrubs thriving nearby testify to these conditions.

plorer of this region has cooked his meal with knots and splinters of guayacan, or used it as a torch. In Spanish-speaking countries the true Lignum Vitæ is much confused with the group of very hard woods belonging to the Leguminosæ — closely related to our black locust. These woods bear the same name of guayacan, and are widely used, but lack the peculiar qualities which are characteristic of the true guayacan.

On the Island of Curaçao, Dutch West Indies, just off the Venezuelan coast, and far down on the point where the work of forest destruction has progressed the least, one may see Lignum Vitæ in its native home.

The island is one of gently rolling topography with but three points, St. Christopher, the Castle Mountains and the Three Brothers, rising well above the general level, and it is at medium elevations that guayacan is most commonly found. The heat here is great, though



SHOWING DETAIL OF THE PECULIAR BARK OF THE LIGNUM VITÆ
The wood is close-grained, heavy and very hard, and the tree, with its richly colored dark green leaves, its blue flowers and orange-red fruits, is in striking contrast to its arid surroundings.

ifornia desert region are the common associates of guayacan. It grows in places as unlikely for tree growth as one can find.

Not only is guayacan important commercially, but it has proved its worth as an ornamental tree. Not to be outdone by mahogany, which has been planted as a shade tree, guayacan is also used in landscape work, and several groups have been planted around the Governor's palace, just inside the harbor.

WAR-TIME USES OF THE WOODLOT

BY AUSTIN F. HAWES

EXTENSION SPECIALIST IN FORESTRY

WHAT has the farmer's woodlot to do with the war? In this time of emergency when the farmer is being appealed to for more wheat and corn; more pork and beans; more potatoes and eggs, and every acre is to be pushed for its maximum production, little attention has been given to the woodlot. That unkept portion of the farm where the cows seek shelter from the summer's heat, where the older people once played at Indians, and the younger ones are now hunting Germans, has never been considered of any serious importance in the farm or national economy.

But at this time of national emergency, when every resource is being scrutinized, and many readjustments are taking place, it is well to consider the woodlot, which in the aggregate forms such a large portion of the American farm. The Geological Survey says in a recently published bulletin:¹ "Nothing is more certain than that the country will, next winter, witness a shortage of coal perhaps more serious than in the winter just passed unless unusual efforts are made between now and next fall to prevent it." When the published statements of the foreign Commissioners, that France and Italy are in serious need of coal, are taken into account it will be realized that the fuel situation is of vital importance to our allies as well as ourselves.

The coal shortage is due largely to the tremendous growth of war industries dependent on coal, and the consequent congestion of freight. Orders have already been placed with our manufacturers which will keep them fully employed for over a year, and therefore a shortening of the war would offer no immediate solution of the fuel problem. It must be realized that there is plenty of coal in the mines, and that the difficulty comes from the inability of the railroads to move it in the winter when there is such a great demand for it. On October 1, 1916, there was a total shortage of 100,000 cars in this country, of which 25,000 were coal cars. The advice of the Geological Survey is that the

consumer should buy and store coal against the needs of next winter, and thereby personally save trouble and expense. When it is realized that every car of coal unloaded this summer for use next winter will release a car for other important and, perhaps, imperative needs at a

time when the need is greatest, there will be no question of the wisdom of this call.

What has all this to do with the woodlot? Simply this: where coal is scarce, wood can be substituted to a certain extent, and should be this winter. Obviously the manufacturers cannot substitute wood; neither can city people, because this would result in even greater railroad congestion.

For the same reason the farmers of Ohio and Illinois, who

can obtain coal on their own farms, might just as well continue to do so. Wherever team-hauled wood can be substituted for railroad-hauled coal this should be done, and may be considered a part of the program laid down by President Wilson. Farmers owning woodlots, and villages which can purchase wood from nearby farmers, can all help, and though it is not expected that many will substitute wood as their chief fuel, they can supplement their use of coal with wood much more than usual. In the seventeen states, including Minnesota, Iowa and Missouri and those to the east, including New England, there is a rural population of about 20,000,000 people, and it is estimated that they use annually about 18,000,000 tons of coal. If by substituting wood one-quarter of the coal burned by farmers and one-tenth of the coal burned in villages could be saved, there would be a total saving of 2,700,000 tons or 67,000 carloads. In fact, it seems reasonable to assume that by an active campaign between two and three million tons of coal can be saved, which is an appreciable factor.

Considering two cords of wood as the equivalent of one ton of coal, this substitution would call for the cutting of about five million cords of wood more than usual. The total amount of wood used in these seventeen states last year was estimated by the Forest Service at 26,571,000 cords.



A LOT OF WOOD FROM A WOODLOT

This shows what a woodlot can be made to do in the way of reducing the high cost of fuel and making a farmer independent, to a large extent, of the coal producer and the overtaxed railroads in the present nation-wide congestion of freight. The cut timber represents a considerable supply of fuel, and the possibilities of the woodlot are by no means exhausted.

¹ U. S. Geological Survey Bulletin 666-M, by C. E. Leshner.

At the close of the harvesting season, there will be a large surplus of labor if the present campaign for farm labor is successful. Some of this can be profitably employed in wood cutting and hauling, and in this way can be kept on the farms over winter. In fact, this winter work might be an important factor in a permanent "back-to-the-farm" movement. The wood cut in the fall could be burned in the latter part of the winter, and enough could be cut in the winter to relieve the shortage in the following winter.

Undoubtedly economic pressure would of itself result in a partial substitution of wood for coal, but since the Government has thought best to stimulate the raising of food in a period of abnormal prices, it should stimulate a

estry work, may serve as an example. Through the Extension Service of the Agricultural Colleges and the various county agents an educational campaign will be started immediately after haying to convince the farmers of the desirability of cutting more wood and cutting it in a proper way. Farmers have confidence in the county agents, for they have found their advice is practical, and they are more intimately acquainted with them than they can be with the State Forester or the Professor of Forestry at the College. Both of these men, with their various assistants,

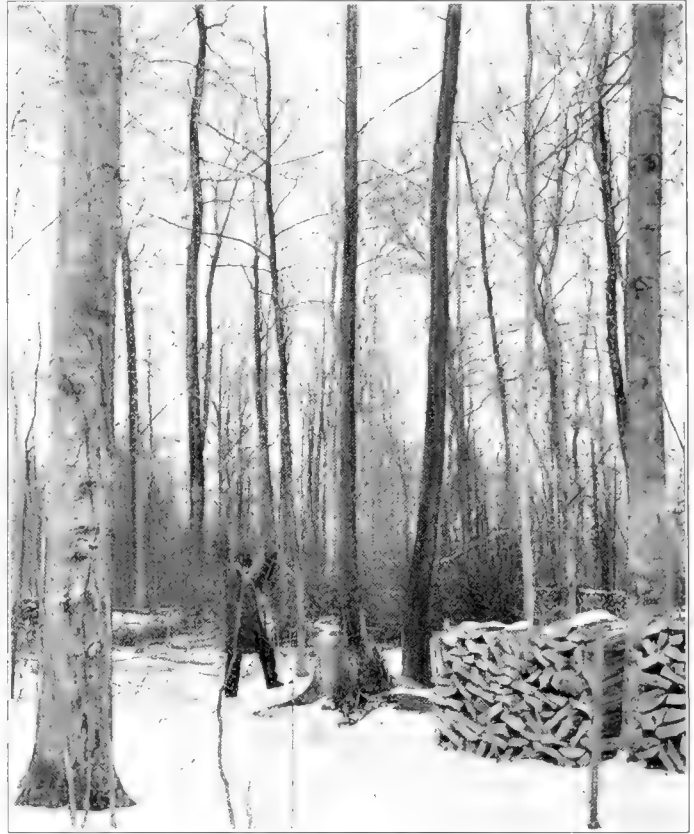


FUEL P.O.B. THE FARMHOUSE

Here is a woodlot at the owner's very door. On this small area in Stafford County, New Hampshire, is a stand of pine timber that is ready to do its share toward solving the fuel problem. By cutting even a slight portion of this timber the owner will be contributing to the national supply of fuel, and he will be doing his woodlot no harm. In the aggregate such contributions will be of vast value.

form of production and saving which is less obvious. Even if the high price of fuel were in itself sufficient to bring about this increased wood cutting, it is evident that widespread, promiscuous cutting of woodlots will do more damage than good. By proper organization, this opportunity can be turned to a certain extent to the improvement of the woodlot and hence of the farm.

The plan to be followed in this fuel emergency campaign illustrates so nicely the coöperative work of the States Relations and Forest Services of the Department of Agriculture that it may be of general interest. Under the so-called "Smith-Lever" law the States Relations Service has been developing, in coöperation with the various Agricultural Colleges, a great system of agricultural education and will eventually have a county agent in every county in the country. The Forest Service for about twenty years has been offering information along forestry lines, and in many states has coöperated with the State Foresters in getting this information to the public. It is now proposed to combine all these forces in a more effective campaign. New Hampshire, which is one of the leading states in for-



WHAT TREES ARE THESE?

This is a woodlot which combines use and beauty, to say nothing of its interest to the student of the trees. It is a stand of mixed hardwoods on a farm in Ohio. In the foreground stands a young tulip 12 inches in diameter and 75 feet high. On the other side is a beech, while near the man are two chestnuts. The younger growth is mostly beech and maple. The woodpile is of beech, for home use.

will furnish the technical information necessary to have the work conducted properly. The County Agents will select certain woodlots, well located in reference to main highways, to serve as demonstrations, and a forester will mark the trees which should be cut. Later the agents will arrange conferences of neighboring farmers in these woodlots, and the forester will explain why he marked certain trees for cutting. So far as possible the forester will visit other woodlots and give the owners instructions to guide them in their work. There is such a complete force of foresters in New Hampshire that it is believed that the whole campaign can be handled very beneficially for the woodlots and their owners. The Professor of Forestry at the College will be responsible for the direction of the work in the two or three counties near the College; and the State Forester with his several assistants will be responsible for this work in the remainder of the State. Other states should follow New Hampshire's example in this emergency.

ENLISTING SOLDIERS OF THE SOIL

IN the present national crisis the members of the American Forestry Association can make no contribution more helpful than their coöperation in the campaign to stimulate Food Production and Food Thrift. The enthusiasm with which they have entered into this work is manifested in letters received by the editor of American Forestry from members throughout the country, endorsing the efforts of the Association and the Magazine to assist and supplement the plans of the National Emergency Food Garden Commission. Mr. Charles Lathrop Pack was the originator of this commission and is its president, which facts give the Association particular pride and interest in the success with which the work is meeting. The movement is already proving of tremendous value in increasing the nation's food supply through the planting of a million or more food gardens. By thus utilizing land that has been unproductive the country is now creating a source of food supply of immense worth in this time of war emergency. The American Forestry Association is doing much by the contribution of its headquarters and organization to the work of the Commission. President Pack feels that the individual members can increase this contribution by doing whatever they can to stimulate Food Production and Food Thrift in their own communities.—THE EDITOR.

AS a clearing-house through which potential food gardeners are brought into intimate touch with expert knowledge on which they can base intelligent work for food production, the National Emergency Food Garden Commission exercises one of its most important functions. In this way the Commission is developing a new generation of gardeners of all ages and guiding them into successful cultivation of vacant land near their homes, to the personal gain of the workers and to the needed increase of the nation's food supply. Authorities agree that the propaganda of the Commission will prove a vital factor in helping America solve one of its most serious present problems, that of supplying ourselves and our European Allies with enough to eat during the period of the war.

The raw material for this movement was at hand. The land was waiting, in the form of back yards, vacant lots and unused tracts of various sizes, in or near every city, town and village of the country. The gardeners were ready in the school children and their elders in every community. That the one thing needed was a national commission to arouse interest in the national need and to supply expert guidance has been shown by the immediate success of the work which the Commission has undertaken. The response has

astonished everybody concerned. That the results will be of vast importance is obvious.

The movement affords a rare example of Thrift wedded to Abundance. It is a case of producing for the purpose of immediate use as well as for saving for the future. The

food garden will enable families in the most moderate circumstances to enjoy the hitherto unknown luxury of vegetables fresh from the garden, and to those who have been denied this privilege the work involved will pay dividends far in excess of the money saved in the purchase of food-stuffs. Anyone interested in statistics may take as his basis the \$250,000,000 of expected output in the Emergency gardens, multiply it by the proper factor of individual satisfaction on the part of the consumers and find, to his own profit, at any rate, the aggregate worth of the dividends to be gleaned by the shareholders in this important war movement.

Thrift is the essence of the undertaking. The nation's shortage in foodstuffs is one of the most serious phases of the unprecedented situation which confronts the American people. It is no exaggeration to say that the country is today in the midst of a food panic. Efforts to place the blame for some of the trouble are interesting and impor-



A SOLDIER OF THE SOIL

Women are taking as important a place as men in War Gardening. Throughout the United States they are shouldering the rake and hoe and adding to the nation's food supply. The costume is a type of uniform being worn by the women and girls engaged in raising food for soldiers.

tant, but as a fundamental it must be recognized that the shortage actually exists. That there may have been manipulation and an exploitation of the country's needs may be determined by those in authority, but regardless of this phase of the matter the one thing clearly indicated as a

tuted, the methods of cultivation were not intensive and the money value of the product was small. Training of the children in the school work showed how this value could be increased and the Commission has data to show that the average school child of reasonable age can produce from \$50 to \$100 worth of vegetables on a piece of ground 50 x 100 feet in size—equivalent to about an eighth of an acre. Let this be done on a considerable scale in every community and it will be readily seen to what extent this will simplify the country's food problem and its transportation problems in the bringing of food to each city or town by railroad freights.

While the school children are the nucleus of the nation's potential army of food gardeners, the work appeals to grown people with similar force. To the man or woman who works eight hours a day in store, shop or office, the making and care of a garden can be made to afford recreation that is not only healthful and financially remunerative but of distinct pleasure as well. Without expert guidance this would not be easily achieved, for gardening is a work that must be conducted along lines of exact science. With the instruction and helpfulness of the



"SOW AND YE SHALL REAP"

Mrs. J. Chester Pyles and Mrs. M. E. Rafter, troop captains of the Girl Scouts of Washington, planting the first handful of seeds on the girl scouts' one-acre farm. The seeds for the farmlet were donated by the National Emergency Food Garden Commission. If a million other American women would follow the example set by these women, the production of food in this country would be increased to such an extent that not only would food prices be much lower but we would be able to supply our Allies with all the food they need.

national duty is to produce more food and do it as quickly as nature makes possible. This is Thrift of vital worth and meaning. It will give the people more food, better food and at a distinct saving in financial outlay. It will release for other uses a vast number of freight cars that would be required to carry to market the foodstuffs which will thus be at hand without transportation, or "F. O. B. the kitchen door," as President Charles Lathrop Pack aptly phrases it. These cars will be available for the transportation of other merchandise, the tremendous movement of which helps create a deficiency in food supplies. In case of military necessity for the use of the railway facilities of the country this phase of helpfulness will be increased several fold.

The development of school gardens in various cities throughout the country has given the Commission a basis for actual figures as to what may be accomplished. About thirty per cent of the families outside of the large cities have home gardens, but, until the school garden work was insti-



DOING A MAN-SIZED JOB

Hard work is play for these girl scouts when the cultivation of their farmlet, on the D. A. R. grounds, Washington, is at stake. These young huskies work like Trojans to grow food to help feed Uncle Sam's fighting men. They are aiding the National Emergency Food Garden Commission in its campaign for a greater food production.

Commission the technical difficulties are removed and a nation of amateur gardeners immediately becomes a nation of experts.

If there is demand for Thrift in connection with the

production of foodstuffs, President Pack feels that there is no less imperative need for Thrift in the utilization of the country's supply. American kitchens waste enough food each year to feed the whole British army in France and several divisions of the French army. The estimate of this waste is \$700,000,000 annually, and this is believed to be conservative. For the elimination of this reckless extravagance it is important that the people of America

of left-over cereals with meats, fruits or vegetables. Even a spoonful of cereal is worth saving as a thickener for soup or gravy. No housekeeper should throw away stale bread, sour milk, scraps of meat or fish, trimmed fats or suet. Even the water which has been used for cooking rice and many vegetables should be saved. Stale bread can be used in many ways, sour milk can be used in baking, meat and fish scraps add flavor and nourishment to



WHAT BOYS CAN DO IN HOME GARDENING

There could be no better evidence of success of the Home Gardening campaign of the National Emergency Food Garden Commission than this picture showing a piece of ground cultivated by a Boys' Club. The young gardeners followed instructions and worked together to increase the nation's food supply. The abundant yield is an eloquent tribute to their success, and an inspiration to others, grown-ups as well as young people.

should consider themselves mobilized into an army of food-savers. This does not mean deprivation. It simply means the exercise of care.

That this care is essential is shown by the insistence of our own military leaders and those of our Allies that the outcome of the war is a matter of food. Every saving, no matter how trivial and small it may seem in itself, adds to the aggregate of the food supply that can make victory possible and certain, just as every new food garden, however small, contributes to the vast total of this new source of food. Without Food Thrift at home the struggle on the battlefields may be to no purpose. Famine may be the great victor, and it is easily conceivable that the war may end in a surrender forced by starvation.

The chief food loss in America is in the private homes. Good food is improperly handled and stored, carelessly cooked, wastefully prepared, or over-generously provided. Extravagant cooks must learn how to use left-overs. Appetizing side dishes may be prepared by the combination

made-over dishes; fat can be used as a substitute for butter and lard in cooking, and cooking water will help to flavor soups and sauces.

The economical preparation of food is an important step in the program of Thrift. Carelessness in peeling will waste 20 per cent of potatoes, turnips and apples. In the average family too much food is habitually served. Simplicity should be the keynote of war-time menus. Too many dishes mean that much food is thrown away. Saving rather than spending should be the motto of the patriotic American home.

In the raising of foodstuffs in emergency gardens the community spirit is an important factor. Efforts of any kind are more successful where the individual feels that his neighbor is working with him. Many persons who have had little or no experience in gardening, but who are ready to learn and to work, are attracted by the idea of community gardens. So many inquiries have come to the National Emergency Food Garden Commission as to the practical

working of such enterprises that a special bulletin of advice has been issued on the subject. This bulletin says in part:

"The advantages of community gardening are several. Considerable back-breaking labor can be saved by hiring the plowing and harrowing of the garden tract. The pro-rata expense for this work will be light and well worth paying to escape the toil of spading by hand. Moreover, in the cultivation of an extended garden tract it is possible to use other labor-saving tools, like the wheel hoe, which are not practical in small back-yard gardens.

"Money also can be saved by the individual members, comparing the cost of community gardens with that of the same tract if tilled in individual plots, in the purchase of garden tools—hoes, rakes, wheelbarrows, sprinkling cans, and the like—because several workers in the garden at different times can use the same tools. In the same way money can be saved in purchasing fertilizer, seeds, and spraying chemicals for insects and plant diseases, and a further advantage is that the community garden is likely to have the benefits of artificial fertilization and spraying which are often dispensed with by the individual who cultivates a small garden.

"The greatest advantage of all which can come to the

A WAR-TIME MOTTO

"PRACTICE Economy, but not Parsimony; cut out Waste—particularly all Food-Waste—but maintain the American standard of Comfort. That is good economics and good business."—CHARLES LATHROP PACK.

tell the novice workers about their mistakes. Once a week would be often enough for such practical instruction. Such first-hand advice for a new gardener often means the difference between a heavy crop and a complete crop failure.

"In general those who engage in such an enterprise should be as far as possible persons of the same interests and tastes, and also of about the same habits in life. Their leisure time should be about the same. Shunt off the chronic kickers, and those who are constitutionally convinced that others are always trying to get the best of them. Every one who goes into such an arrangement should understand exactly what the coöperation proposes to do. It ought all to be down in black and white before anything is started or any money spent. While each member is enlisting to share in the produce, he is also pledging his pro-rata amount of labor. The points of trouble in any community garden undertaking are likely to come in these two places.

"It is important that the volunteer manager be a man

workers in a community garden is the possibility of their obtaining expert instruction. For a small cost some expert gardener—perhaps a market gardener on the outskirts of the city—can be hired to visit the community garden at intervals and



ONE YOUNG CANNER'S VERSATILITY

This "Girl from Utah" has established a reputation that may well bestir the envy of the experienced housewife. With a view to doing her bit in the matter of Food Thrift, she started at the top of the vegetable and fruit list and worked through it. The result is here pictured. In each of the five rows may be counted eleven jars. No two of them are duplicates as to contents. This means that the young lady canned fifty-five varieties of vegetables and fruits in a single season. What will she do when she is twice as old?

in whom all the members have confidence as to his fairness and ability. Once he is selected, he should be given rather a free rein in the management."

With local organizations thus perfected the Emergency Food Garden movement has been making rapid headway throughout the nation. The readiness of communities to organize for the production of food has been remarkable, and the Commission finds itself flooded with requests for information and coöperation, all of which are given prompt and cordial attention. For the instruction and guidance of these organizations and individual gardeners the Commission is furnishing daily planting lessons to newspapers all over America. Nearly 2000 newspapers throughout the country are now using these lessons, which are supervised by agricultural experts. They tell what, when and how to plant and how to insure a full crop. Due regard is given to climatic conditions in various sections of the country, and these lessons have been instrumental in bringing about the creation of thousands and thousands of flourishing gardens all over the land.

Not the least important phase of the individual's duty in connection with the food supply of the nation is in the matter of canning, the season for which is now here. Too much emphasis, says President Pack, cannot be placed on the necessity for preserving fruits and vegetables during the season of their abundance for use when winter shall have arrived. This



CANNING BY COMMUNITIES

A high measure of efficiency in canning is reached by application of the Community Spirit. Inasmuch as canning is one of the fundamentals of Food Thrift, Community Canning should be encouraged. It reduces cost and labor and induces food conservation on a larger scale than individual effort.

work wherever possible, the Association is urging the establishment of canning centers in each suffrage league throughout the states or in coöperation with other women's societies in communities. Farm and garden clubs of local

leagues are being urged to plan at once to open canning centers with the ripening of the asparagus, spinach and rhubarb crops and to follow this up throughout the season. Provision for a supply of cans is characterized as of first importance, as a shortage exists and prices are rising. A volunteer or paid expert for supervision and instruction is deemed essential, to the end that the greatest degree of efficiency may be attained.

A number of the most prominent women on Long



FAIR CANNERS AT THE FAIR

Canning operations may be made as interesting as an afternoon tea. In this picture is conveyed a suggestion of the allurements of community work in preparing vegetables and fruits for winter use. These charming housewives—or future housewives—are club members who are busily engaged in the conduct of a demonstration in canning at a county fair. Incidentally the picture is a good matrimonial recommendation—which is quite another story.

Island have organized the Long Island Food Reserve Battalion to interest the women of that section in organizing clubs for canning, preserving and storing surplus vegetables and other food supplies. The scale on which the work is being conducted is shown by the action of the Long Island Railroad in sending a special instruction train over its lines for a week during the latter part of May. The train ran on a schedule announced in advance, allowing stops of an hour each at stations throughout Long Island. At each stop lectures were given by Mrs. H. B. Fullerton, Mrs. A. Louise Andrea and other experts, and an opportunity given to inspect the exhibits, which included complete outfits of canning implements, jars and crocks. Reports indicate that the train was instrumental in arousing intense interest and enthusiasm among Long Island women.



READY FOR THE SHELF

This cauliflower has been through the routine by which it is prepared for the winter. Notice the firmness of the product and the perfect retention of form made possible by the cold pack method of canning vegetables and fruits.

over a hot fire and then putting them into sealed cans. This was laborious and expensive, and it was actually cheaper to buy canned goods from the grocer than to put them up at home.

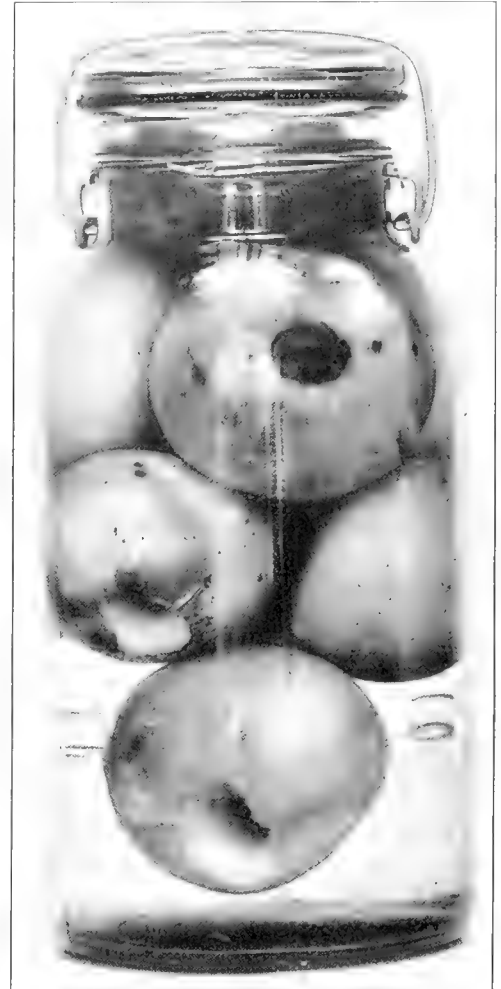
The modern method is by means of sterilization. Science has proved that the decay of food is caused by yeast ferment and other forms of bacteria and germ life. Fruits and vegetables cooked in the old open kettle were of course sterilized by the hours of boiling. Too frequently, though, the food products thus prepared would not keep, for the reason that they were placed in cans which had not been sterilized. The loss thus brought about was no inconsiderable item.

Sterilization, under the modern process, does away with

this loss. The foodstuffs are placed in cans and sealed before being subjected to heat. The cans are then placed in boiling water or in live steam and kept there until the heat has destroyed all germ life within holders or contents. This may or may not cook the contents of the cans. Whether it cooks them or not does not matter. Partially cooked fruits or vegetables prepared by this process will keep as well as those thoroughly cooked.

This method saves time, labor and expense. The foods are placed in the cans when cold and can therefore be handled quickly and easily. The sterilization period is frequently short, and with this saving of time is combined the economy made possible by dispensing with thick syrups and preservative spices. Fruits can be preserved in thin syrup, and vegetables require only water and salt as a flavoring solution. A distinct advantage is the ease with which the

process can be applied, making it practicable to put up small quantities to as good advantage as larger quantities. The thrifty housewife can thus preserve a single can of surplus foodstuff. This makes possible true household efficiency, as it enables her to save for the winter any small surplus of a garden crop, or an excess left over from her grocer's order. Recognizing the importance of food-canning, the National Emergency Food Garden Commission has issued a special bulletin of instructions which will make it possible for every housewife to preserve food products of the highest standard at slight cost of money, time and labor. Copies of this bulletin may be had without cost on application to the office of the Commission at 1410 H street, N. W., Washington, D. C.



APPLES CANNED WHOLE

If all housewives realized what may be done with apples there would be none of the prodigious waste of this fruit that takes place every year. Why let apples decay in the orchards when they may be canned like this, during the season of abundance, and saved for the lean months of winter?



FLOWERS THAT BLOOM IN JUNE

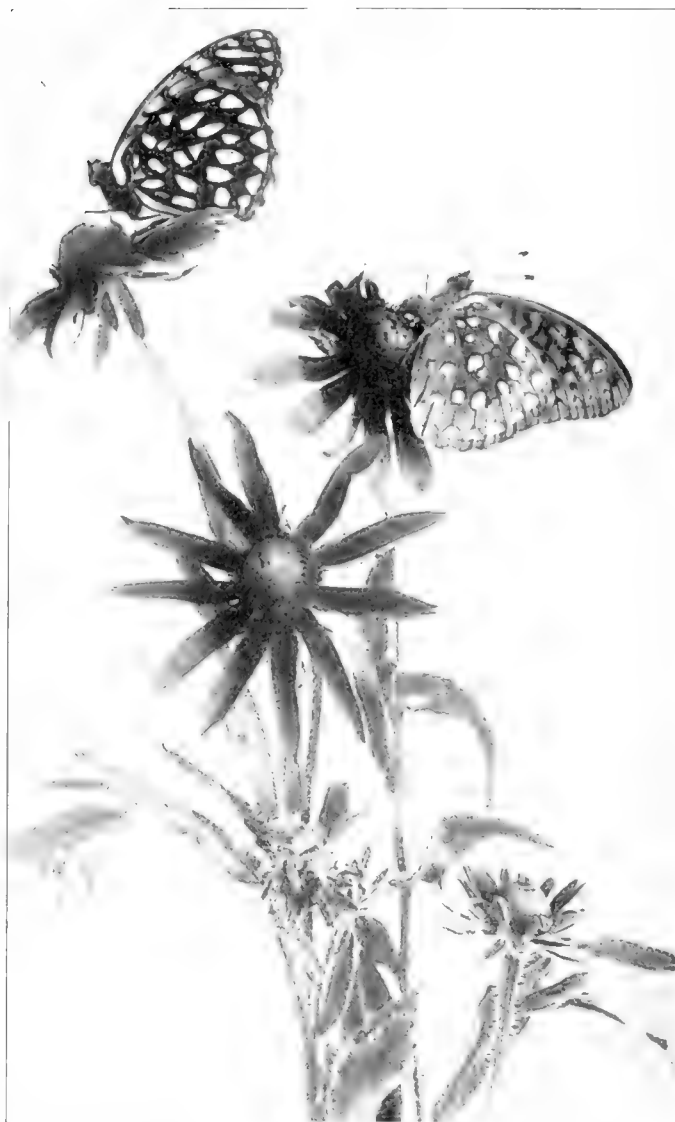
BY DR. R. W. SHUFELDT, C. M. Z. S.

ALL through the northeastern section of the United States, the month of June marks the long-looked-for season by the student of wild flowers, when field and forest, marsh and meadow are actually aglow with hundreds of different flowers that were not in evidence earlier in the year. One meets with them upon every hand, just so soon as one passes beyond the environs of the city; or, if one lives in the country, almost before there is a chance to



THE FLOWER OF OUR HILLSIDES AND ROCKY CRAGS

FIG. 1.—This is a fine specimen of the Wild Columbine (*Aquilegia canadensis*) which belongs to the Crowfoot family along with such plants as Larkspur, Hellebore, Buttercups, and many others (*Ranunculaceae*). There are several species and varieties of the Wild Columbine, as well as a Garden Columbine (*A. vulgaris*), in which the flowers are blue, purple, pink, or even pure white. This wild one, however, has scarlet flowers that are yellow inside; it nods upon its slender stem, which causes its hollow spurs to point upwards; though when the flower drops off the fruit points the same way. The Columbine is a perennial, having 2-3-ternately compound leaves with lobed leaflets. The five hollow spurs are backward projections of the petals, which latter are all alike. The five regular sepals have the same color. Pistils likewise are five, with slender styles. The erect pods contain many small seeds. Range: general; blooming from the latter part of April to the middle of June.



BLACK-EYED SUSAN, A FAVORITE FLOWER OF EARLY SUMMER

FIG. 2.—Nearly every one who goes afield is so well acquainted with this conspicuous "Yellow Daisy" that it hardly requires a description. It is the *Rudbeckia hirta* of the botanists, and belongs among the *Compositae* or great Composite family. It also bears the name of Cone-flower and Nigger-head—the latter being particularly inappropriate from any viewpoint. There is no trouble in finding it on its range anywhere, during the months of June to September, for it grows in the dry soil of meadows, brakes, and roadsides, from western New York to Manitoba and southward. Originally it came from the West mixed with clover seed. In various localities it presents certain variations in its flowers and leaves, and it may be either an annual or a biennial. There is a pair of Aphrodite butterflies (*Argynnis aphrodite*) on the upper flowers, a very beautiful and abundant species of the eastern part of the United States; it is a near relative of *A. cybele*.

pass out of the front gate. Their name is legion; and, to mention some of them here, with a view of giving an idea of their abundance, colors, or marvelous beauty, is to do a rank injustice to the host of others left off the list. Only a few can be considered at a time, with the hope of continually making records of others as the months pass.

First, we may choose the Columbine (Figure 1). That superb plant, with its beautiful flowers, is known to nearly every one that at all frequents the open; moreover, its unique structure and form is no stranger in many country or even city gardens, where we meet with the Garden Columbine, a species with hooked spurs, originally introduced from Europe. In northern New York the Wild Columbine is sometimes seen to grow most luxuriantly out on hilly meadows; but this is by no means the case elsewhere, for it is, perhaps, above all other flowers, the one that adorns our hillsides, where masses of loose stones occur, or, even

more frequently, wherever patches of soil are to be found among the granite cliffs and on the sides of rocky ravines. There its lovely red and yellow flowers bob away in the breeze, often in such inaccessible nooks as to be quite beyond the reach of the ordinary climber. Many a venturesome swain has had his tumble, in his endeavor to gratify the wish of his sweetheart—standing far below him—for a bunch to take home for a vase on her mantel.

Mrs. William Starr Dana has written very feelingly about this. She says of the Columbine that "it contrives to secure a foothold in the most precipitous and uncertain of nooks, its jewel-like flowers gleaming from their lofty perches with a graceful *insouciance*, which awakens our sportsmanlike instincts, and fires us with the ambition to equal it in daring and make its loveliness our own. Perhaps it is as well if our greediness be foiled and we get a tumble for our pains, for no flower loses more with its surroundings than the Columbine. Indeed, these destructive tendencies, which are

strong within most of us, generally defeat themselves by decreasing our pleasure in a blossom the moment we have ruthlessly and without purpose snatched it from



NEW JERSEY TEA, A CONSPICUOUS FLOWER OF THE WOODLANDS

FIG. 4.—This tall, shrubby plant, with its pretty clusters of white flowers, received its name, *New Jersey Tea*, from the fact that, during the War of the American Revolution, its leaves were quite extensively used to take the place of tea leaves for the making of tea; it belongs to the Small Buckthorn family (*Rhamnaceae*). It also occurs on gravelly shores, ranging from central Maine to western Ontario and southward. In the neighborhood of Washington, D.C., it is quite abundant in open and dry woods, and early in July is abundantly visited by a black beetle of no great size, three specimens of which are shown in the picture. *New Jersey Tea* is the *Ceanothus americanus* of the botanists, and there appears to be but one other species of it described for our flora, *C. ovalis*, which is of rare occurrence in the eastern districts.

its environment. If we honestly wish to study its structure, or to bring into our homes for preservation a bit of the woods' loveliness, its interest and beauty are sure to repay us. But how many pluck every striking flower they see, only to toss it carelessly aside when they reach their destination, if they have not already dropped it by the way!"

There is great variance of opinion as to how the Columbine got its vernacular and scientific names. The dove, the eagle, and other forms enter into the discussion, but the story is too long to print here.

Fertilization is performed principally by a number of species of bees, though the humming birds play no mean part in this rôle. The honey is held in the five backward-extending spurs which are called the nectaries, and the five sepals are red like the petals.

But on this long and sultry day toward the very last week in June, let us pass out of the cool ravine where the Columbines grow, into the blazing sun, as it mercilessly heats the air, and the fields, and everything growing in them for acres around. Near at hand is a sluggish, muddy stream, with a great mass of bramble skirting a part of its bank. But all this, and all this scorching temperature, is precisely what the flower about to be noticed fully enjoys. This is the Black-eyed Susan, and there are hundreds of these gorgeous, orange fellows in sight, standing up boldly against the heat everywhere. It would make a salamander



THE COMMON TREE FROG, A WELL-KNOWN DENIZEN OF THE FORESTS IN JUNE

FIG. 3.—Le Conte named this remarkable little imp of the woods *Hyla versicolor* for very excellent reasons; and Mary C. Dickerson, in her splendid volume "The Frog Book," says of it, on page 117: "Probably more familiar than any other member of the batrachian group, if we except the common toad, is this entertaining little acrobat of the frog world. Some June morning, when we are admiring the blue flowers of the clematis that climbs the porch, we see what looks like a yellowish white oval of putty plastered against the white pillar shaded by the vine. It is our Common Tree Frog (or Tree Toad, as it is called) sound asleep." This author gives no fewer than 18 colored and plain figures of this species from life in her book, as well as a beautiful plate of a piece of woods or forest where they are to be found; its history is an extremely interesting one.

blush to think of it; and every year that passes, this royal representative of the *Composite* seems to be more and more abundant in that same locality. There is a reason for this,



THE CURIOUS LEATHER-FLOWER OF THE RICH LOWLANDS OF THE SOUTH

FIG. 5. Here is another representative of the Crowfoot family (*Ranunculaceae*) which has been called the Leather-flower (*Clematis viorna*) on account of the thick, leathery sepals, four of which, with their recurved tips, are joined at their margins as shown in the cut. F. Schuyler Mathews, in his useful "Field Book of American Wild Flowers," says, on page 130, that it is "a southern species with solitary, thick, leathery, bell-shaped, dull purple flowers without petals, the purple sepals about one inch long. The three or more leaflets with unbroken edges or lobed. In early autumn the hoary plumage is brownish. Southern Pennsylvania, south to Georgia and Tennessee and west to Ohio." The specimen here shown is a Maryland one, collected on the Georgetown Canal, and the vine was growing in rich, marshy soil, amid a mass of other vegetation.

just as was found to be the case with respect to the White Daisies in last month's AMERICAN FORESTRY: they are rich in pollen, and the bees, butterflies, and beetles do the rest. Neltje Blanchan truly says: "Anyone who has

had a jar of these yellow daisies standing on a polished table indoors, and tried to keep its surface free from a ring of golden dust around the flowers, knows how abundant their pollen is."

The New Jersey Tea, here shown in Figure 4, is also called Wild Snowball, as well as Red Root, from the deep reddish tint of that part of the plant. A tan-colored dye



A PRETTY MIDSUMMER DAISY

FIG. 6. This is the Common Daisy Fleabane (*Erigeron ramosus*) of the *Composite* and it belongs in a genus in which occur some ten or more species, with as many varieties, so it is not always an easy task to distinguish them. Indeed, common as this plant is from June to October, east of the Mississippi, in fields and along roadsides, it has been incorrectly identified by not a few authors on flowers. Note that the stem is slightly hairy, and that it is panicled—corymbose at the summit; that the lanceolate leaves are entire or occasionally once-notched, and scattered. Flowers white, sometimes tinged with lilac. This is the *Erigeron strigosus* of Muhlenberg and of Mathews. The central disks are bright yellow, and constitute the true flowers; the white rays correspond to all daisy-rays. Robin's Plantain, Sweet Scabious, and Horse-weed or Butter-weed all belong in this genus, and are close relatives of the Asters.

is made from these roots which possesses some economic importance. As one passes through the silent woods in June, a group of these conspicuous, shrubby plants appears to stand out boldly and apart from the surrounding vegetation, and the sight is by no means an unattractive one.

There is hardly any danger of mistaking the curious Leather-flower (Figure 5), nor the long, straggling vine upon which it is found, for any other flower, although some botanists touch upon the possibility of this in their works.

However, such slips are occasionally made, and it will be as well to correct one here, which appeared in the last issue of *AMERICAN FORESTRY*, when *Plantago lanceolata* was incorrectly described and figured as *Plantago major*; the first-named is the English plantain, Rib Grass or Ripple Grass, whereas the latter is the Common plantain.

There would seem to be no doubt but that the beautiful little white daisy shown in Figure 6 is the Common Daisy Fleabane, or Sweet Scabious of some writers, though this flower is often confused with the Daisy Fleabane. In

the last edition of Gray's *Manual*, we find the Daisy Fleabane or Sweet Scabious called *Erigeron annuus*, and the Daisy Fleabane, *E. ramosus*, the very next species to it; Mathews seems to confuse the two. In any event, the White Daisy Fleabane is one of our most abundant plants, and in some sections it may be found along the roadsides everywhere. These plants got their curious name from the fact that some people believe that when burned some insects would shun them; and so we often see bunches of them so treated hanging in country cottages.

FOREST FLOWERS

BY BESSIE L. PUTNAM

WE are apt to look for our flowers in a class quite apart from trees, and to value the latter, from the æsthetic point of view, merely for their verdure and shade. And yet some of them are quite as much entitled to floral recognition as some of the garden flowers grown merely as flowers.

Almost before the pussy willows have burst their furry

catkins, the flower clusters of the red maple have burst their buds, accentuating the brightness of color which the twigs have been for weeks gathering, and which, to the close observer, render the tree little less interesting in spring than after the bright autumn colors are donned. Less showy but far more graceful are the greenish blossoms of the sugar or hard maple, which appear a little later than



Photo by American Museum of Natural History

THE WILD CRAB

Blossoms most beautiful and fragrant, and in May time, when the flowers are at their best, attracting the bees and other winged creatures by the hundreds.



Photo by American Museum of Natural History

THE DOGWOOD

The showy flowers of the dogwood—the banner of spring. One of the most conspicuous of all the flowering trees, making the hillsides in May truly beautiful.



FLOWER OF THE TULIP OR
YELLOW POPLAR

The flowers of the yellow poplar closely resemble tulips in form and size and even in coloring. Of a pale green almost cream—with markings of orange, they are very beautiful.

the leaves, and which, with their long, slender pedicels, envelop the tree in a fairy-like fringe which sways with the gentlest breeze.

In May the hillsides glow with the glistening white of the dogwood, perhaps the most showy of all our forest blossoms. And yet the flowers are not white after all, but are a greenish yellow, clustered in groups of twenty or more, each surrounded by the four-leaved involucre which is known in common parlance as the flower. These floral envelopes vary much in size and purity of color, this depending partly upon the individual tree, and partly upon the season; and it is a common saying among farmers that when the dogwood blossoms are small the fruit crop will be correspondingly small; in other words, Jack Frost is quite as partial to nipping the dogwood as the apple blossoms. When the dogwood is in bloom, as well as "when the oak leaves are as large as squirrel's ears," is the accepted time for planting corn.

About the same time the pink buds of the wild crab are burst-



FLOWER OF THE SUGAR MAPLE

The graceful blossoms of the hard maple, coming just after the leaves and which with their long, slender pedicels envelop the tree in a fairy-like fringe, swaying with every breeze.

ing, filling the air with a fragrance which calls bees and other winged creatures by the hundreds. Talk about the beauty of apple blossoms; they are not to be compared with those of the wild crab! The Japanese may revel among their cherry blossoms, but with *Pyrus coronaria*, which is usually at its best in middle latitudes at Decoration time, we may well be satisfied.

Most interesting are the flowers of the tulip tree, *Liriodendron tulipifera*, resembling the tulip in form and size, and quite as strangely marked as some of the parrot tulips, with their blending of pale green with orange crescents. In autumn the winged seed-pods expand, almost like glistening straw-colored flowers. Scarcely less interesting are the leaves, each abruptly notched at the end into a shape so distinctively its own that there is no possibility of mistaking the foliage of the tulip or whitewood for that of any other tree. In geological times there were several species, but now we have but a lone species, now largely grown in many parts of Europe as a shade tree,



A SPRAY OF BASSWOOD (LINDEN) BLOSSOMS

These creamy flowers are prime favorites of the bees, which fact alone should commend the planting and care of the trees for their commercial value as honey getters.



THE CHESTNUT

This photograph speaks for itself—it is unnecessary to enlarge on the beauty and grace of the flower of the chestnut—a feathery, creamy mass of bloom in late June or July.

and well deserving a place among our own ornamental trees of park and lawn. In its forest home it grows to a height of more than a hundred feet, but when planted in the open it is more compact in form, and as symmetrical with its low growing branches and lower stature as when its limbless trunk stretches up among the forest trees.

The cucumber tree, *Magnolia acuminata*, is a handsome tree with large flowers resembling in shape those of the famed magnolia of the South, though smaller and sadly lacking in their greenish color the waxen beauty of their subtropical cousins. The fruit, which resembles a small cucumber, eventually splits open at every seed, allowing the bright scarlet seeds to be suspended by their slender, thread-like attachment for some days before they finally become detached.

The basswood, with clusters of creamy blossoms, each bearing a curious leafy bract, furnishes an abundance of most excellent bee pasturage. This feature alone should insure to the tree liberal planting. Valuable for its wood, it pays its way after the very first years in the abundance of amber honey which it produces.

In our own opinion, there are few more attractive trees when in bloom than the chestnut, now surely doomed unless its persistent enemy can be routed. Though the beautiful trees near New York have all been sacrificed and the chestnut tree blight is surely passing westward, there are still many beautiful specimens, laden in July with a feathery

mass of creamy catkins. True, the pistillate flowers are rarely noticed by the uninitiated, but it does not require a botanist's eye to appreciate the showy staminate tassels.

The last of all trees or of all flowering plants to bloom is the witch hazel, in some localities scarcely attaining to more than shrub-like dimensions. When

its neighboring trees are casting their autumn leaves, this strange species expands its small, strap-shaped honey yellow blossoms, the fruit of which does not mature until the following mid-summer. The plant has a highly specialized method of seed sowing, as unique as are its flowering plans. When ripe and dry the capsules burst elastically, propelling the seeds, according to William Hamilton Gibson, forty-five feet by actual measurement. If one wishes to test these sharpshooters, a simple method is to gather some of the branches in mid-



FLOWERS OF THE CUCUMBER TREE (*MAGNOLIA ACUMINATA*)

This is a handsome tree with large flowers not unlike those of the famous Southern magnolia, though they are greenish in color and lack the waxen beauty of the true magnolia.

summer, when the fruit has nearly reached maturity, and place them in the living-room. As the pods become dry the capsules split and the bony seeds are thrown quite across the room.

And yet this seeming anomaly in reversing nature's rules for flowering is only anticipating its companions in the process, for while the other trees simply perfect their flowering buds for the coming season, this joker expands them. That is all the difference! And so between the pussy willow and the witch hazel there is an almost constant procession of forest flowers, each worthy of our attention.

IF the 25,000,000 trees planted in the Pennsylvania state forests were set four feet apart, as they actually are in the woods, and planted in a straight line, they would cover almost 19,000 miles. Planted twenty feet apart, they would provide shade trees on both sides of 40,000 miles of highway.

STATE Forests with a total of over 3,600,000 acres have been established in thirteen states. Of these New York has the largest forests, which comprise 1,826,000 acres; Pennsylvania is second with 1,008,000 acres, and Wisconsin third with 400,000 acres.

A SINGLE issue of a New York Sunday paper is said to consume the timber from fifteen acres of forest. If Pennsylvania's state forests were fully stocked, they could furnish enough pulpwood to keep forty Sunday papers going indefinitely.

THE latest advice is not to char the ends of fence posts before setting them in the ground. The charcoal is said to hold water and thereby hasten rotting of the post.

ABSORBENT cotton, vests, hose, and handkerchiefs are now being made from wood in Germany.

“WITCH'S BROOM” ON JAPANESE CHERRIES

BY C. W. H. DOUGLASS

WITCH'S Broom,” a peculiar form of tree growth which is caused by the attacks of a parasitic fungus, has been recently discovered on Japanese cherry trees presented to the United States by the Japanese Government during President Taft's administration. These trees were imported in a shipment containing many varieties of Japanese flowering shrubs which are used for ornamental purposes in Japan and were considered suitable to our climate, and were set out in Potomac Park, part of the beautiful park system of Washington, D. C. Despite the facts that a previous shipment was destroyed because of possible danger of introduction of diseases and insect pests and that this second one was carefully examined both before leaving Japan and after arriving here, the disease came in undetected. What the result will be no one can tell. It may spread to our native cherry trees and do an enormous amount of damage and it may do little or no harm.

Importation of trees and plants is often fraught with great danger. A plant that may not be harmful in its na-

tive haunts may become a danger in new surroundings; a disease that may have lived for centuries on plants without attracting attention because of the mildness of its activities on the native hosts, may run like wildfire and do great damage if allowed to spread and attack a new host. In both cases the reason for the sudden activity is that the forces which nature developed to prevent the dominance of any one individual at the expense of others are lacking in the new surroundings.

It is recognized that plants gradually develop a resistance to disease which may amount almost to immunity. Thus down through the years the disease may be attacking and the plant defending, with the result a deadlock. But allow the disease to spread to another species of the plant, one that has never been attacked and has therefore had no occasion to develop resistance, and the results are likely to be very destructive. Two widely-known examples can be found in the chestnut and white pine forests of the Eastern United States. Dead chestnuts and pines bear mute testi-



GOVERNMENT CHERRY TREE DISEASED

On the left is a Japanese flowering cherry tree, one of those presented to President Taft by the Japanese Government and planted in Potomac Park, Washington, D. C. This tree was removed as soon as it was found to be diseased. Out of a shipment of several thousand cherry trees about twenty were subsequently found to be infected with a parasitic fungus which caused a short, dense growth generally known as “witch's broom.” This particular tree was probably attacked while a small seedling, as it is entirely “broomed.” The normal tree on the right shows the contrast.

mony to the destructive power of the chestnut blight and the white pine blister, both diseases imported from abroad on nursery stock from which they spread to our native species.

In like fashion many other diseases of trees and shrubs, as well as dangerous insects and diseases of animals and human beings, have been transplanted from one part of the world to another with enormous losses resulting from their unbridled, destructive activities. "An ounce of prevention is worth a pound of cure," and it is with that idea in mind, rather than any definite knowledge of grave danger, that

try wherever the climate is favorable to their growth and development. This wide distribution gives the problem a serious aspect, for the eradication of the disease is thus made very difficult.

Following the discovery of the disease on the Japanese trees in the District of Columbia, specimens of European cherry in other places were also found to be affected similarly, but whether the disease is the same has not been determined. Although the life history of the disease has not been worked out, some general information regarding it is available. Investigation has shown that the infection



EFFECT OF "WITCH'S BROOM" ON JAPANESE CHERRY

This is another of the trees presented to President Taft by the Japanese Government. In this case the right-hand branch is free from infection, while the left one has several brooms on it. After a branch is attacked it will continue to grow, but will rarely, if ever, develop either flowers or fruit.

a warning is issued against imported ornamental cherry trees which may be infected by the recently discovered or a similar disease.

The flowering cherry trees of Japan have attained world-wide fame because of their beauty and decorative value and have naturally been imported into this country in considerable numbers for ornamental purposes. Owners of many large estates have purchased them for this purpose and they can be found here and there throughout the coun-



INFECTED LEAVES OF JAPANESE CHERRY

This close-up view of an infected tree shows how the spore-bearing bodies on the under side of the leaves cause them to crinkle. These spores ripen just after the blossoms are out and are blown from one tree to another when the leaves are small and tender. Normal leaves can be seen among the crinkled ones, and this comparison is the best way to ascertain whether or not leaves are infected, as the spore-bearing bodies are apparent only as a faint white bloom almost invisible to any but the practiced eye.

is caused by a parasitic fungus—one that lives on the tree, drawing its nourishment from the living tissues but at the same time allowing the tree to live. The life activity of the tree is so changed by the parasite, however, that while producing for a time an extra dense foliage growth, it does not produce flowers or fruit, as all the flower buds become leaf buds. The dense aborted growth is the result of the tree's response to the stimulus of the attacking disease.

The illustrations show the characteristic appearance of infected trees. In the first a normal tree is shown at the right in order to bring out the contrast with the diseased specimen. The diseased tree shown was evidently infected

in the nursery before it left Japan as every branch is diseased, making a "Witch's Broom" of the whole tree. The fungus grew as the tree grew, sending its thread-like bodies through the living tissues of the tree and stimulating the peculiar form of growth. Both the density and the shortness of the infected tree are clearly shown in this illustration. The second view shows a tree that was evidently attacked after it had attained considerable size. The main branch on the right is free from infection, as is shown by the normal growth, but the broomy growths occurring in several places on the left branch each show the presence of an infection. It is probable that this tree was infected through the leaves.

In the third illustration are shown the infected leaves. The fungus develops the spore-bearing bodies on the under side of the leaves, causing them to curve downward around the edges to give the spores the advantage of a sheltered place to grow and ripen. The crinkled effect identifies these leaves, which are quite easily distinguishable from the normal leaves around them. It is quite difficult to detect the spore-bearing body on the under side of the leaf even by close examination, as it is very inconspicuous. A faint white bloom is the only visible sign of its presence. After the spores have ripened and have been released into the air, to be carried about by the wind, the leaves on which they developed blacken and die. This will ordinarily happen a few weeks after the leaves first appear.

In spreading from tree to tree it is probable that the leaf is first attacked. The infected tree develops the spores on the leaves and releases them about one week after the tree blossoms, so that they are free to attack other trees when the leaves are only about half-grown and are still tender and easily penetrable by the thread-like growths of the fungus.

It is not known whether any of our native cherries have yet been attacked by this foreign parasite. But they may

be eventually, and the fact that they have had no opportunity to develop resistance might mean a serious spread of the disease if it once gains a foothold. The disease would have an immediate effect on trees used for fruit production, inasmuch as the diseased parts of a tree produce no fruit. The effect on the lumber-producing cherry trees would be felt only in the far future. It would be impossible to use for lumber a tree that was made up of thick, broomy branches. In fact, it is very doubtful if a tree attacked early would ever reach merchantable size. The money value of the fruit and lumber-producing cherries makes care in preventing the spread of such a disease very much worth while.

Since blossoming time has passed and this year's crop of spores has long since ripened and started on the hunt for prey, there is little possibility for action that will accomplish immediate results in preventing the spread of the disease. All cherries should be carefully examined, however, for evidence of infection. If trees or parts of trees bear few or no blossoms, have a dense, broomy growth, show curled leaves which blacken at the edge and fall early, the assumption is that they are diseased. They should be removed as soon as detected, in order to prevent any possible spread.

Although several species of Japanese cherry are commonly infected, the Yoshiro variety (*Prunus serrulata*), but more commonly called *Prunus Yedoensis* was the most commonly attacked in the Washington Park and it is therefore especially to be suspected. The Asagi or green-flowered variety will also bear watching.

In addition to this "Witch's Broom," these same Japanese cherry trees are affected by the injurious Asiatic twig borer described in a recent number of AMERICAN FORESTRY. That two such destructive pests could enter the United States on a shipment as carefully watched as this second one was, is conclusive evidence that importation of living plants from abroad, even if inspection shows them apparently clean, is unsafe.

FORESTERS IN WAR WORK

THE following interesting letter has been received from one of the foresters with the Forestry Battalion, Canadian Expeditionary Force, stationed in England:

"We are now getting so close to the end of our timber at Windsor Park that I have been kept pretty busy looking over new areas. It is easy to find timber but difficult to find areas suitable for an operation like ours. Most of the timber I saw was small Scots pine averaging about fifteen thousand feet B. M. per acre. My last trip was to Whitley Camp. I am glad to say that we have given over our old system of leaving slash. Our men now burn as they cut. At the same time pit props (mine timbers) are cut and the fuel wood is piled. We find that this system takes but little time and has obvious advantages."

From a forester in France: "Over here in France our world is centred of course on the Western front and I have not heard very much of the doings in the forestry world in Canada. Occasionally I meet the local French National Forest officials and I can assure you that we have many interesting professional talks together. Our present log-

ging operation, of which I am in charge, is on a French National Forest of mixed hardwood and softwood. It reminds me very much of the lectures given by our Dean. The forest authorities exercise full control over the private holdings such as we are cutting upon. For instance, we must clean the surface entirely of all wood and debris, not leaving even a twig. Luckily the local French peasants are about and they eagerly take all the refuse. This is appreciated when I tell you that this winter was a very severe one in France and coal was very dear and high, \$50.00 per ton. Interesting details of our operation I will reserve for your interest when I return to Canada. It is impossible to put them on paper."

The Forestry Battalion being recruited by Major Lyons has sent over a company and another will be ready in a few weeks.

BALSA wood, found in Central America, is said to be the lightest known wood. It is lighter than cork and has an average specific gravity of only 0.104.

THE FLORIDA MAGNOLIA TREE

BY JENNIE LYNNE KYLE

THE Magnolia is one of the typical trees of Florida. In no state in the Union does it attain such magnitude of growth and beauty. It inhabits the low, richlands along the rivers and swamps, but many fine specimens are found at varying distances from the river line.

Its form is majestic and stately. While the great Live Oaks and Water Oaks may be called the Kings of the Florida forests, the Magnolia tree towers to as great heights, and its wide-spreading branches are almost as powerful as those of the great oaks. Its downward spreading branches tend to give it an oval shape and when given space in which all sides are exposed to the sun and air, its symmetry of form gives it rank as the most beautiful of Southern trees.

The Magnolia tree of Florida grows to a height of one hundred to one hundred and twenty-five feet, the largest known measuring eighteen feet in circumference at the base. The diameter is usually uniform up to one-half the height of the tree, where it gradually diminishes in circumference to a small diameter at the top of the tree.

Its roots are powerful and strong. The largest ones run outward, very near to the top of the ground, to a distance equal to the length of the greatest limbs of the tree. These underground roots are to some degree an imitation of the tree above ground—a provision Nature makes for its stability and protection.

The leaves measure from ten to thirteen inches in length by three to four inches in breadth. They are oval at the end—thick and heavy—of a rich dark green color at maturity, which is most beneficial to the sense of sight in this land of bright sunshine and

heat. In summer and winter the tree is clothed in this heavy mantle.

In winter the leaves are a great protection to the tree from cold and assist Nature in her work of beauty. When all other trees are bare, except the Live Oak, whose leaves are dull and brown in

color, the Magnolia trees are richly clothed in their leaves of green.

The winter months are only a preparation for the bursting forth, in May, of the most gorgeous and wonderful flowers. The buds begin to form about the first of April and many are open to greet the May-day festivities.

During May and June the tree presents a wonderful picture of many hundreds of these noble flowers. Each new shoot on every limb bears a flower. Just before the bud matures to a perfect flower its white form is a beautiful oval figure, resembling a half-opened rosebud, and is at this time in its most perfect form. In a few hours eight large petals unfold themselves into a flower so large, so rich in its creamy whiteness, yet so pure and delicate, that one touch of the finger, or the breath from one's body, will taint its loveliness and in a few moments the wound will cause a dark brown spot to appear. No impurities dare come in contact with its soft, delicate texture, though while on the tree in a pure atmosphere and sun it lasts for many days. No bloom of any tree or flower is so large, so fragrant, yet so delicate, pure and beautiful.

In the centre of this flower is a small cone of delicate green shade—a wonderfully made thing of beauty—a model of the finest and most delicate workmanship which



A MAGNIFICENT FLORIDA MAGNOLIA

This majestic magnolia is typical of the species. It is well located and so has developed its wide-spreading branches in almost perfect symmetry. The heavy mantle of leaves—a rich, dark green in color at maturity—protects the magnolia in summer and winter, too, when all the others, except the Live Oak, are bare.

only the hand of Nature can mould. At its base and extending upward about half an inch, the cone is a purple shade, in which are stuck many little creamy narrow stems about an inch long. Just where they are attached to this

The seeds are of the shape and size of a bean, and when full grown are of a bright red color. By September the cones have matured and they begin to fall to the ground. The pockets burst and the seeds fall out. They may be gathered and sold for sixty cents per pound to a perfume manufacturer. A rare perfume is made from them, which possesses the same sweet, delicate scent as the flower, and a soothing calmness pervades one while inhaling it.

It is an old but unfounded belief that the southern Spanish moss is a parasitic plant—that it feeds upon the magnolia in a most appalling manner, absorbing the juices of the tree, and retarding its growth. It hangs in long, graceful streamers from the limbs—very beautiful to the observer, and not fatal to the tree.

But the glory and magnificence of these wonderful trees



A YOUNG MAGNOLIA

This tree has attained to height and stateliness, though it is still quite young. Note particularly the heavy growth of symmetrical limbs, reaching nearly to the ground.

purple cone each stem is also purple. Above these, arranged in regularity all over the remaining part of the cone, are from forty to fifty small, round, curling, transparent stems which are to form pockets for the seeds which are to develop later. The Magnolia bloom measures from ten to twelve inches in diameter.

The many large leaves surrounding the bloom are of a bright, tenderest green color—curved and grouped in Nature's most graceful lines.

By July Fourth the last of these magnificent flowers has gone and the cone begins to develop. Each of these pockets is now closed and contains one or two seeds.



A STately MAGNOLIA BEAUTIFULLY FESTOONED WITH SPANISH MOSS

This splendid tree is fifteen feet in circumference at its base. The Spanish moss with which it is so heavily hung may, as some claim, retard the growth of the limbs and leaves, but it surely adds greatly to the picturesque appearance of the tree.

are more fully brought out on moonlight nights. When the atmosphere is clear and with a full moon in the background look up at their mighty statures! They stand in silence, and the graceful contour of trunk and limbs stands out more boldly. Their very greatness seems a protection to one, their beauty a pleasure to one, and a study of them calls one closer to Nature.

THE Pennsylvania Department of Forestry refuses to be scared by the white pine blister rust. Almost 50 per cent of the 3,750,000 trees planted on the State Forests this spring were white pine.

THE KNOT OVER WASHINGTON'S TOMB

BY GAYNE T. K. NORTON

"YES sir, dat ole black walnut am two hundred years ole, an I done cry when she die las spring," repeated the aged and wrinkled black man who stands guard over the tomb of George Washington, at Mount Vernon, Virginia. A quarter wormed more of the tree's history from him, but a refusal the day before of \$2,800 for his house could not be driven from his mind and speech, talk of it he would, toying my quarter the while. Still, what I saw, gathered and heard, not of the colored gentleman's realty, but of the black walnut, was most interesting. (F)

Certainly the old veteran was an aristocrat of tree-land, and its "knot" many traveled far to see. As it is a growth of extreme rarity on a famous tree, soon to be no more in its present condition, and as it has never been "written up," a description should prove interesting. By the time these lines travel the long road to print the tree will have been cut, and the knot transported to the National Museum as an exhibit.

The tree was planted by John Augustine Washington, father of George, on the 2,500-acre farm granted him by Lord Culpepper, in 1674. Until the fall of 1915 it grew as only a black walnut can grow, bearing fruit, giving shade, and lending dignity and beauty to the historic and picturesque home on the banks of the Potomac.

As it stood in the fall of 1916 it had a diameter of more than three feet and a height of ninety. Hanging like a huge nut from the under side of a heavy limb, 25 feet from the ground and 12 from the trunk, was the strange growth, an organic disease, tumor, or cancer, that perhaps caused death, and which certainly made the tree famous.

When viewed from a distance the "knot" has somewhat the appearance of a walnut grown to immense proportions; when silhouetted against the sky from below it gives the impression of a jagged relief map of a strange

continent. Accurate measurements are impossible, but it is well over four feet high and more than five feet through; the weight cannot even be guessed, for the condition of the interior is not known. When viewed from directly beneath, the bulk does not hang evenly, rather it

bulges far to one side, as if North America—the "knot"—was suspended from a straight rod—the limb—which touched Newfoundland, and California at Los Angeles.

About two-thirds of the surface is covered with very rough bark. On the portion nearest the ground is a whorl, almost a cowlick. The bark runs around and up and down, is very thick and distinctly that of a black walnut. The portion not covered by bark is deeply lined, weather-beaten, discolored wood, pricked with innumerable holes, yet sound. It appeared like a flesh wound healed without attention, a bit of living dead-wood. The lines run up and down, are deep and uneven. Around the edge the bark is smooth, humped and rounded. This portion of the knot faces southeast. On the upper portion is a depression into which many of the lines curve, like a miniature whirlpool.

The "knot" began to grow more than 100 years ago, when the supporting limb was a slender branch, so the colored guard affirmed, though he was hardly there

at the time. But he was there 86 years ago and has watched the steady development.

After watching the barkless portion insect activity was discovered, and the sunlight glistened upon the wings of hundreds of Chinese honey bees. The swarm took possession 25 years ago and is still using the "knot" as a hive. Some lay the death of the tree to the bees, reasoning that so much honey has been stored within that the flow of sap has been prevented. None have been allowed to mar or even examine the tree, which accounts for the lack of



Photograph by G. T. K. Norton

THE "KNOT" ON THE BLACK WALNUT THAT SHADES GENERAL WASHINGTON'S TOMB

The cancer or tumor, a large and rare growth on a famous tree. Offers of hundreds of dollars are made for the "knot," but it is destined to go to the National Museum as an exhibit. A swarm of honey bees have been the occupants for twenty-five years, and some claim the honey stored by them has caused the death of the tree by stopping the flow of sap.

accurate figures about the "knot." The bees and birds have been the only investigators.

Almost daily offers for the "knot" are made by curio hunters and other nature-loving visitors; one man was even then, at the time of my visit, trying to purchase it for \$500 and this offer was called "mean and low compared to some" by the guide.

On the beautiful Washington estate are many other grand old trees, each with a story. Three neighbors to the black walnut are interesting: they commemorate the first of a chain of events that all but wrecked the Union. General Washington did not believe in slavery and accordingly set his own free. These first free slaves, free in name only, for they could not have been driven from General Washington, planted the trees about the spot he had set apart for his tomb. After 118 years the trees still live. The two red cedars are rotting, hollow and bent, but time has not been so hard on the sycamore.

The first thing one with an eye for the beautiful in nature will notice at Mount Vernon, particularly if he arrives by the boat, is the number and grandeur of the trees; there are dozens of fine veterans of many species, all perfectly cared for and in fine condition. Comparisons with at-home conditions are involuntary; we regret that our streets and yards are not so beautifully ornamented. Only in one other place have we seen such trees—Washington.

Possibly we all know of specimens, or even localities, that compare well, though it is doubtful if any city can as a whole equal Washington in point of trees. It is they that give it more than half its charm; their powerful influence is quickly appreciated. If possible, they are even more beautiful than the trees of Mount Vernon.

Without them the city would be as all others: great stone piles of modern efficiency. The trees can be thanked for the "human-ness" of Washington, and they show in luxuriance the care given them.

SOME HISTORICALLY INTERESTING TREES

THE following interesting notes, about historic or unusual trees, were sent by Mr. Henry B. Abbott, of Philadelphia, who writes: "I am sending a picture of the Old Oak in the Friends' graveyard at Salem, New Jersey. It is considered the finest specimen of white oak in the State, and its picture has been adopted for use on the New Jersey State forestry crest, or emblem. It is about 85 feet high and symmetrical. Tradition says the British cut out the top during the war of the Revolution. It is supposed to be about 300 years old. Some years ago a currant bush was found growing and thriving in one of the crotches of the old oak, the seed having presumably been carried by a bird, but of course it did not live and has long since disappeared.

"On a trip to Orlando, Florida, some few years ago, I saw an old live oak, to which the Indians came and held their councils. I understand it was the meeting place of the Florida Indians generally, and its situation seems to bear this out. Except for a few

trees in a small segment, there was a large open circle, maybe a hundred feet in radius, without trees. So far as I know, the place or tree has not been photographed. It was only a trunk with a few limbs when I saw it, and I fear it has now disappeared."

Another very interesting tree Mr. Abbott describes as traditionally known to be "the tree where Columbus tied his ships." This is located on the river Osamece at Santo Domingo, and is an old landmark, regarded with veneration and love by the people of the locality.

While we do not vouch for the correctness of its claim to historic value, the appearance of the old monarch inclines us to place some faith in the traditions which surround it. It does not seem impossible of belief that Columbus landed and made fast his ships at this point, when he settled the small colony at Santo Domingo—lovingly named by him "Hispaniola," and where later his remains were temporarily interred. Mr. Abbott continues:

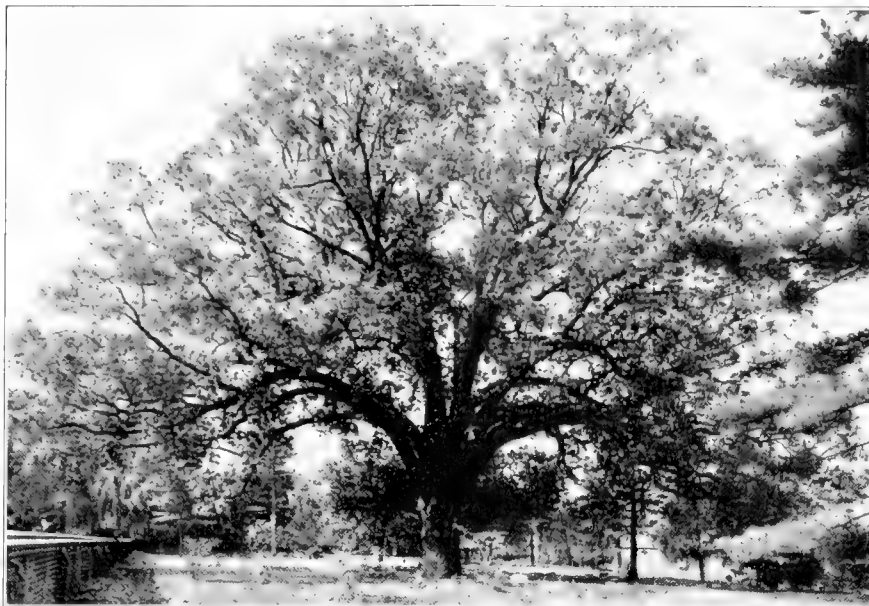
"There are, a mile or two west of Had-



WHERE COLUMBUS TIED HIS SHIPS

A veteran tree at Santo Domingo, marking the spot—local tradition has it—where his ships were made fast when, on his second voyage of discovery, Columbus founded Hispaniola.

donfield, Camden county, New Jersey, two yew trees, which I think are about 200 years old. Elizabeth Haddon was the settler of Haddonfield. There is an interesting account of her in a book called 'Social Hours with Friends.' After she had been over here two years she went back to England to see her parents, and then returned, bringing these two little trees in two little pots. They are now in rather



THE OLD OAK AT SALEM, NEW JERSEY

This beautiful and symmetrical old tree is located in the Friends' Graveyard, at Salem, New Jersey, and its history dates back to the days of the Revolution. It is about 85 feet in height and, despite its age, is considered to be the finest specimen of white oak in the State.

a dying condition. Like the English yew, they are bush-like, with several trunks. A five-cent trolley fare from Camden takes you past the farm.

"Did I mention the old cypress tree here in Bartram's Garden? John Bartram was the botanist of the country at and before the time of the American Revolutionary war. He received many gifts from across the ocean and this young tree was one of them."

RUSSIA'S LUMBER INDUSTRY

THE importance of the lumber industry in Russia is figuring largely in the plans for Russia's export trade after the close of the war. The demand for building materials will be unprecedented and the vast resources of Russia's forest wealth have scarcely been more than touched. Furthermore, hundreds of square miles of forest in the crown lands now confiscated are available for exploitation. With the marvelous increase in the harbor facilities of Archangel and Vladivostok and the extension of railroads in the forested districts, this industry has a big future. In 1913, the last year of normal export, lumber worth 165,000,000 rubles was exported. By the closing of the Baltic ports this export has been reduced to a valuation of 27,200,000 rubles. Vast stores of timber have accumulated, and in Archangel alone 65,000,000 rubles' worth of timber is ready for shipment. In 1916, when an increase in exports is noticed, little big timber was shipped, the exports being mainly pine for matches and spruce for paper pulp. Domestic consumption of timber has been large, a considerable quantity being required for military purposes. The demand for railroad ties has been great and the erection of factories all over the country at a time when unusually heavy demands were made upon railroad facilities has caused many of these factories to burn wood instead of coal. As, however, the Ministry of Agriculture possesses a modern and progressive Forestry Bureau, this use of timber for fuel is being managed in such a way as to increase rather than deplete the great forests of Russia.

WISCONSIN'S FOREST PLAYGROUNDS

THE Wisconsin Conservation Commission has completed plans for the utilization of the state forest lands, and has worked out a general plan to make the northern Wisconsin region, the land of lakes, a playground for the entire Middle West, by throwing open state lands for campers and summer visitors. The State plans to carry this work of developing the pleasure resources of the forest to the greatest extent, and has devised a general system by which long-time leases will be given for a few dollars a year to those who wish to build summer cottages. The State also will build some cottages for rent in the state parks and in the forest reserve, and is providing portable cottages for other locations. For those who do not want any of these, the Commission is arranging to lease tent sites. Meanwhile, the Commission is planning a campaign to prevent forest fires with the assistance of the lumber manufacturers who own forest land, on a plan for coöperative work in maintenance of a force of forest rangers and fire wardens. This is already being done in upper Michigan, and Commissioner Frank B. Moody at the last meeting of the Northern Hemlock and Hardwood Manufacturers' Association started a formal movement for such a coöperative campaign. The State is going ahead with its plans to make its forest reserve region, including Vilas county, which alone has 1,200 lakes, as though the war were to end immediately, so that the summer resort life may be carried on despite the war, and is offering special opportunities for the wives and families of those who may be busy on the business of the war.



Photograph by W. A. F. L. L. L.

ONE REDWOOD TREE AS A SOURCE OF BUILDING MATERIAL

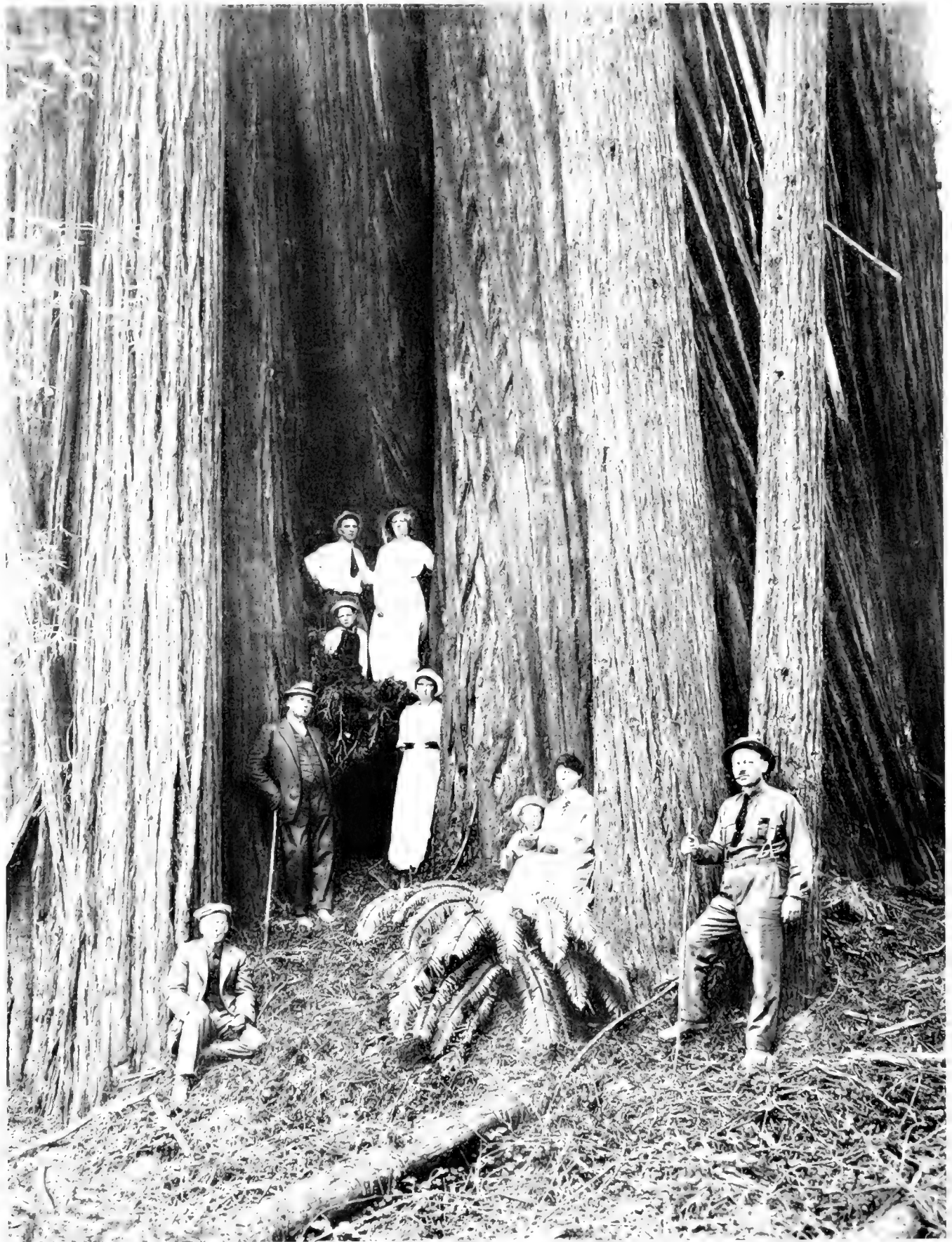
An order for 100,000 feet of lumber is not to be disregarded by the lumber dealer, for 700,000 feet is a good deal of merchandise in his line. To a giant redwood, however, it is nothing at all. In this picture may be seen Luther Burbank leaning against one of the patriarchs of the Ah Pah tract. This particular tree is eighteen feet in diameter and would easily yield 100,000 feet of merchantable lumber. The Ah Pah tract in Northern California, owned by Charles Willis Ward, contains many of these giants, and it is unlikely that heavier stands of timber can be found in the Redwood belt than those in this neighborhood. Among these trees there are veterans which were well grown at the beginning of the Christian Era. Some of them are 3000 years old.



Photograph by W. A. Fishbauch

MORNING FOG AMONG THE REDWOODS

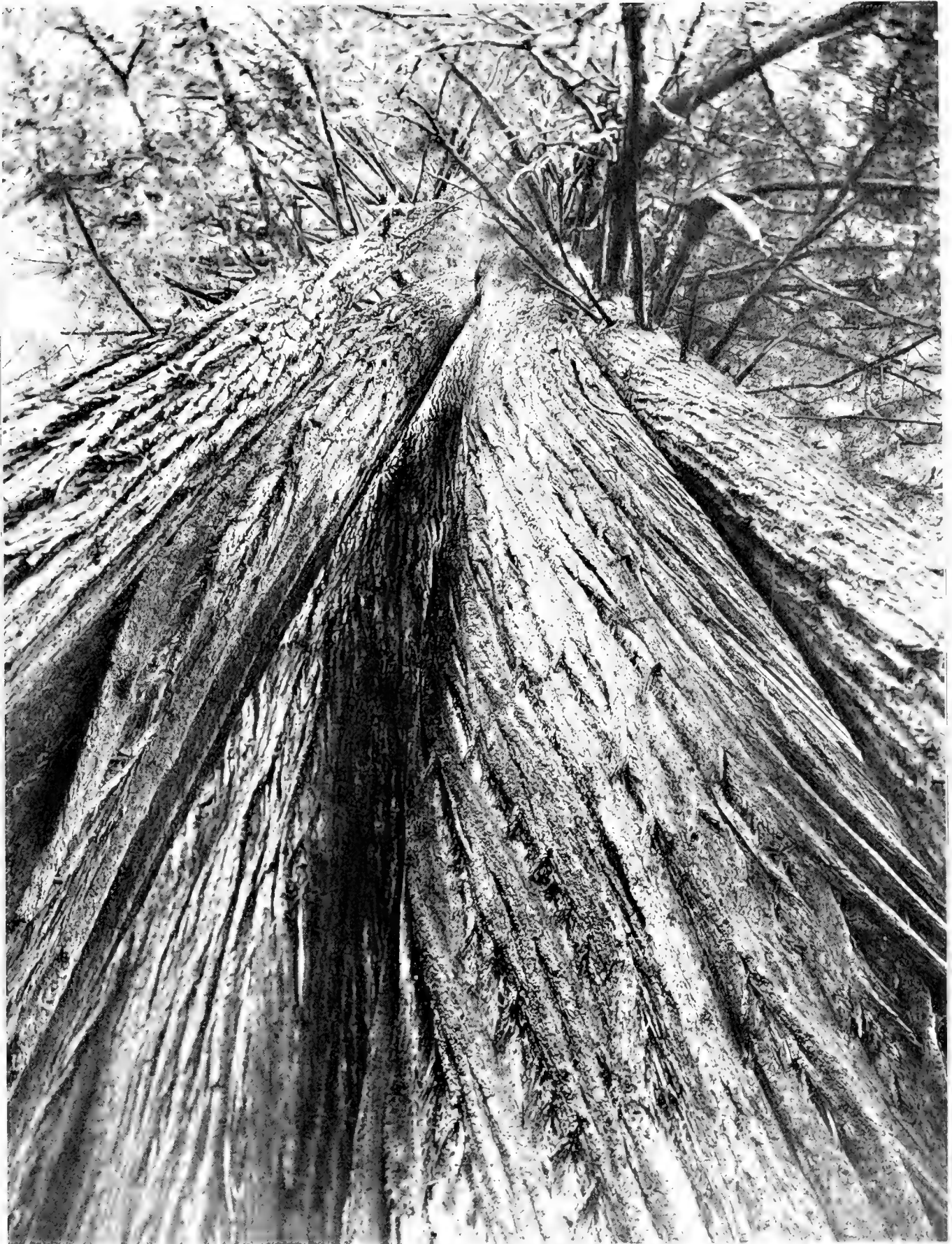
Fog and the Redwood seem to go together. Wherever you find the giant trees at their best you can count with confidence on a daily bath of fog. The clouded streaks in this picture are not an indication of defective photography. They are accurate portraiture of the morning sunbeams breaking through the fog as they prepare to drive it away. This occurs between nine and ten o'clock each day during the summer season and those familiar with the California forests agree that it is one of the most interesting manifestations of nature's routine program. The spectacle is an unfailing source of interest to visitors to whom it is new. Some idea of the size of the trees may be had by noting the relative insignificance of mere man as shown in the foreground.



Photograph by W. A. Lathrop

THE BEAR'S NEST IN THE REDWOODS

This picture shows a camping party at the foot of the group of Redwood trees known as the Bear's Nest. Luther Burbank is to be seen at the left. His expression indicates his admiration for the skill displayed by Nature in the grafting operation which welded these trees together at the top. The Bear's Nest, which is in Northern California, is easily accessible to visitors and camping parties, for Charles Willis Ward, owner of the land on which the trees have stood for centuries, has connected the various remarkable clumps of giant Redwoods by pleasant trails communicating with the central campground of his Ah Pah tract. Last August Mr. Ward and some of his friends spent their annual vacation at Ah Pah Ranch, as he has named his camping grounds. "We never open a tin can at the camp," is the owner's boast, "as our garden provides a bountiful supply of vegetables and fruits." Is it any wonder that the place is popular with campers?



Photograph by W. A. Frihaugen

PROPINQUITY MAKES AFFINITIES EVEN OF TREES

These Redwood trees have grown together at the top, and this photograph, which was taken from the ground with the camera pointed directly skyward, is proof that Nature is a grafter when opportunity offers, as the joining of this group of great trees could not have been more skilfully wrought even by an expert hand. The trees are known as the Bear's Nest, a group of giant Redwoods which grew so closely to each other that their amalgamation was inevitable. They are on the Ah Pah tract, a great timbered park in Northern California, owned by Mr. Charles Willis Ward. Surrounding them are innumerable Redwoods of immense size that would yield nearly half a million feet of lumber to the acre. Another view of the Bear's Nest group, showing how it looks nearer earth, appears on the opposite page.

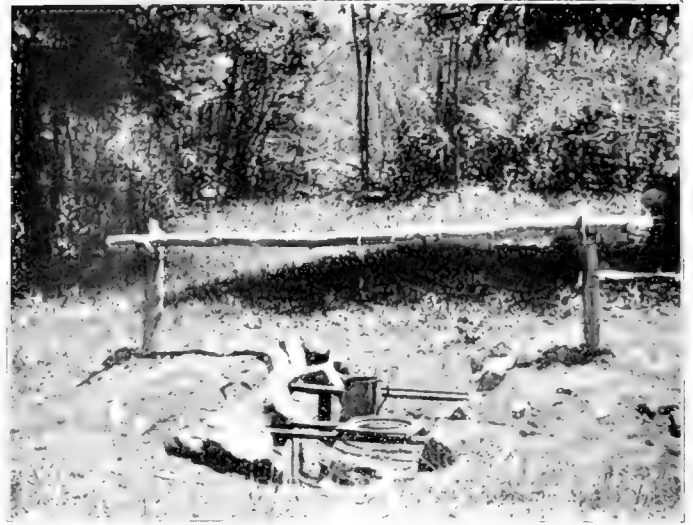
"PRIVATE PROPERTY NO CAMPING"

BY SMITH RILEY

DISTRICT FORESTER, DENVER, COLORADO

"WELL, of all the messes I ever saw this is the worst. Why can't travelers show a little more consideration for other people's property and for other travelers who follow them?"

The speaker was an owner of land, along a popular fishing stream, traversed by a state road noted for its scenic features, and his remarks were called forth by the sight of a particularly attractive corner of his property strewn with



WHERE CAMPERS ARE ENCOURAGED

The United States Government is contributing generously to the comfort of campers, rich and poor alike. In National Forests tourists will find camp sites laid out for their use and forage preserved for their benefit. In this picture is shown a typical fire-place built by forest officers in recognition of the needs of campers. Maps are provided and the Forest Service is doing much to stimulate the recreational use of the parks.

their lunch amid the attractive surroundings. Soon a party of horsemen appeared upon the road. Reaching a meadow on the far side of the river, they entered through a gate, pulled off the saddles and turned their mounts loose to graze, roll, and trample the tall grass. After lunch this second party produced guns and proceeded to disfigure the bole of a large tree by shooting at a mark. The report of the guns disturbed stock in a nearby pasture, and at the same time caused their own horses to trample a great amount of grass. Soon an irate owner came upon the



FREE CAMP GROUND IN DENVER PARK

Enterprising cities in Colorado have taken steps to meet the public need and demand for places in which camps may be made. Denver has converted a part of one of its largest parks into camp sites which may be occupied free of charge by motorists and others who come with camp equipment, with the assurance that no signs will be found warning against trespass.

papers, lunch boxes, and broken beer bottles. The smooth bark of a nearby aspen tree had been completely disfigured by numberless initials of those who, after enjoying the beauties of the spot, thoughtlessly abused the privilege accorded them of camping there. As the owner saw the matter, nothing remained for him to do but to place a strong wire fence between his land and the road, and on it to display a "No Trespass" sign. Such signs have blossomed along public highways in all thickly settled portions of these United States.

I recall an incident: a family started out one Sunday by automobile for a day in the open. When lunch time came the car was passing through a river bottom bordered with large trees and green banks. Wire fences lined the road closely, so that this party left their machine beside the road, crawled through a somewhat dilapidated wire fence, and proceeded with joy and large appetites to eat



AN ATLAS OF THE ROADSIDE

As a part of its policy to encourage the recreational use of the National Forests the Forest Service posts map-signs at strategic places along the roadside in the public domain. In the foreground, near the left margin of this picture, is shown a board on which is posted a map of the neighboring road system in this forest. On the tree in the center is a sign giving additional information.

GOING FISHING?

THE FINEST TROUT STREAMS, THE BEST HUNTING GROUNDS AND THE MOST BEAUTIFUL CAMPING PLACES IN AMERICA ARE TO BE FOUND WITHIN THE NATIONAL FORESTS.

90,000,000 PEOPLE

ARE JOINT OWNERS OF THE NATIONAL FORESTS

YOU

ARE ONE OF THIS NUMBER

HELP PREVENT FOREST FIRES

LIGHTED MATCHES, CIGARS and CIGARETTES are DANGEROUS. PUT OUT YOUR CAMP FIRES BEFORE LEAVING. DON'T BUILD BONFIRES.

KEEP THE FORESTS GREEN.

U. S. Department of Agriculture Forest Service

INVITING YOURSELF TO FISH

The National Forest Service goes on the theory that the 90,000,000 people of the United States are the real owners of the National Forests. Evidence of this is afforded by signs like the one pictured above, in which citizens are made to invite themselves to fish, hunt and camp on their own property. Prospective tourists will do well to note the injunction as to preventing forest fires on their own property.

scene to drive off the party of riders. This done, he approached the automobile party and in very abusive language ordered them out. They were responsible for all the trouble, he explained, because the riders would never have entered the meadow had they not observed the automobile party inside the fence across the river. The owner went on to say that he did not object to visitors who did not injure his property, but that in this case real damage had been done, and therefore the party must leave at once. It is due to such incidents as this that the number of "No Trespass" signs steadily increases.



NOW BEAUTIFUL AND INVITING

But, disfigure the trees and strew the ground with empty pickle bottles and papers, and then—can we blame the owner for posting "No Trespass" signs?

A long step in this direction, and almost the first of its kind, has been taken in the case of the National Forests. No finer recreation grounds exist anywhere, and each year a greater number of people come to the Forests for the pleasures of outdoor life. The Forests belong to the public, and are being developed for its benefit. Here is an example: the east entrance to the Yellowstone Park is through the Shoshone National Forest. Thousands of wagons and pack and saddle horse parties pass over this road in a season. Imagine the inconvenience to the traveler if this road were lined with fences and "No Trespass" signs. But it isn't. On the contrary, the Forest Service has set aside a strip of country upon each side of the road where visitors to the Park may graze their horses. Certain places have also been reserved as camp locations, and signs are posted along the way for the visitor's guidance. In short, upon this much-used thoroughfare the visitor's needs are considered first; nothing is permitted to interfere with his enjoyment.

It is the same in other places in the National



HOW OWNERS PROTECT THEMSELVES

Those who have seen the damage wrought by some campers do not consider it strange that owners of land should steadily increase the number of "No Trespass" signs. If all campers would show the proper attitude toward the rights of property owners these signs would be unnecessary. Because of the custom of strewing papers, lunch-boxes and empty bottles over temporary resting places, and the actual damage sometimes caused, the owners display the signs in self-defense.

Forests visited by pleasure seekers. Camp sites are laid out and forage reserved for the traveler's benefit. Signs posted in conspicuous places ask him to use care with fire and to leave his camp site in a sanitary condition. Garbage pits are provided in which he may burn litter and waste-paper. In this way it is hoped to educate the visitor in ways different from those which arouse the ire of private land-owners. The signs tell the camper, for one thing, that he is part owner of the National Forests, and that injury to them means injury to his own property. Other than the rules regarding fire and proper camp sanitation, there are no restrictions upon those who come to the National Forests for recreation. Maps of the Forests, showing the location of attractive camp sites, fishing streams, postoffices, telephones and ranger stations, are distributed by the various supervisors. The recreational resources are being developed in the same way as the other resources, like timber, water, and forage. They are open to everybody on equal terms, and are meant for the enjoyment of the man with the slim pocketbook as much as for the man with the fat one.

In marked contrast with conditions in the National Forests are those on most privately owned tracts. Here, for example, is a lake famous for its fishing, used by many people as a recreation ground. The lake is situated so as to make it possible to impound a supply of water for electrical power. A power company obtains a deed to the land surrounding the lake and builds a dam. This enlarges the lake, making it of even greater value for recreational purposes, but as soon as the power company gains control of the land it sticks up signs warning the public to keep off—the land is private property.

Recreational use of the borders of the lake would not in any way interfere with the impounding of the water. Had the title to the lake shores, which were once the property of the Federal Government, been retained under public control and an easement given the power company to impound water, the company would have had all that was needed for the development of power, while the public would have had the opportunity to enjoy the lake. As it is, the opportunities for recreation which the lake affords are wholly wasted.

I know of a National Park that is approached along the valley of a river where there is much patented land not cultivated or cropped. In days gone by the owners of

these lands did not protest against the public using them, for in those days few people came to the region. Nowadays, however, travel over this road has increased two or three hundred per cent, and "No Camping" signs have blossomed forth everywhere, while long stretches of the road have been fenced. One owner of a considerable amount of land in the vicinity has announced his intention of developing water upon his property and allowing visitors to camp there. It should be explained, however, that for the use of this camp location a charge is to be made of \$1 per day per person.

Several cities in Colorado have already taken steps to meet the need for public camping grounds. Denver has set aside in its largest park an area which may be occupied free of charge by those who motor with camp equipment. Colorado City and Colorado Springs also have free camping areas where motor visitors are welcome.

To come back to the National Forests, I should like to quote from an article published in a Denver newspaper:

"The Government, by its well-worded, cordial invitations and the magnificent roads it creates and maintains, will eventually draw the public to sections where liberty instead of restraint is in the air. Perhaps the most striking illustration just now is the boulevard from Steamboat Springs to the top of the Rabbit Ear Range. Here are twenty-five miles of perfect road, thoroughly signed and posted, through a fern and flower country of such magnificence that a visit only can tell its glories. The movement is young, but one who runs can read that the day of barbed wire and selfish restraints on the tourist is doomed."

The road referred to was built by the Forest Service, in coöperation with the counties concerned, through the Routt National Forest. It is one of a great system of good roads which the Forest Service is building in the National Forests as a means of opening them up to the public. The sum of \$10,000,000, to be spent a million dollars a year for ten years, was appropriated by Congress in 1916 for National Forest roads. A sum equivalent to 10 per cent of the gross receipts of the Forests is also available annually for road building purposes. In time the full recreational possibilities of the National Forests will be made available for the enjoyment of the American people. In the promotion of public health and public happiness the Forests promise to be a tremendously valuable national asset.

FOREST fires in the United States have caused an average annual loss of seventy human lives and twenty-five to fifty million dollars' worth of timber. The indirect losses run close to half a billion a year.

THE California State Forestry Department has thrown open to the entire state, and those from other states, the state forests as a national pleasure ground, in the theory that by thus treating the national forests the future of the forests is best assured.

SAVE coal by burning wood which can't be used for anything else. The fuel value of two pounds of wood is roughly equivalent to that of one pound of coal.

WHEN cutting firewood, remove the poorer species first from your woods. Defective chestnut might as well be cut, for the blight will surely get it. Soft maple, gum, sassafras, catalpa, aspen, and hackberry are not often valuable for other uses.

OVER 40,000 forest fires burned 5,900,000 acres of forest in the United States in 1915. About 1,100 of them burned 380,000 acres in Pennsylvania.

NO wonder newsprint is scarce. There are 2,580 daily newspapers in the United States. Over 800 have gone out of business since the rise in paper prices began.

CACTUS LAKES

BY FRANK COYNE

CACTUS growing in standing water! Cactus, the one plant above all others associated by the layman with the desert. Yet here are vast expanses of forests of cactus growing in standing water, with here and there little islands appearing but slightly above the general level. Certainly, a remarkable phenomenon to one familiar with the cactus in its normal habitat. Through our great dry West great areas of desert land, whether in the Mojave desert in the California-Arizona section, or in the Great-Basin and Western Colorado Plateau country of Nevada and Utah, one will find cactus growing in its typical zero-phytic habitat, on the driest of soils, together with its frequent associate greasewood and sagebrush.

Down in the Dutch West Indies on the island of Curaçao, just off the Venezuelan coast, is the site of these pictures. To the blacks living here in their little thatched huts and content to earn a living on a few acres of maize, cactus is perhaps the most common plant, and quite a factor in their lives. It furnishes practically all the material for their fences or hedges; the housewife in the morning throws the washing at the windward side of the cactus fence to dry (and more than one indignant traveler and tourist has pondered over the sight of holes in his palm-beach suit or shirt); and perhaps at "medio-dia" she cuts a few of the tender tips from her fence and washline for soup! I've actually seen goats grazing on the species shown in the pictures, whose spines are anywhere from one to five inches long. And let it be remembered that the species eaten by the goats is not the "spineless Burbank cactus."

Five species of cactus are found here on the island, and to botanists the names of *Cereus*, *Opuntia*, and *Melocactus* will be familiar. *Cereus*, the species seen in the picture, and called by the natives "Dattoe," in their "Papia-

mento" language (which is a patois of French, English, Spanish, Dutch and Portuguese), is the most common and is to the thatched-hut dwellers here, in its diversity of uses, what blubber is to the Esquimau in his igloo.

In Curaçao this species grows on all soil formations and at all elevations, from the beach lapped by the Caribbean to the top of the highest peak, St. Christoffelberg. On the



THE FOREST OF CACTI

General appearance of cactus forest on the Hato Plains after heavy tropical shower; Curaçao, Dutch West Indies.

hill-tops one finds it associated with Brazil-wood and *Lignum Vitæ*, where lazy iguanas lie in the branches of the trees and where tiny chameleons run along the branches and trunk of the Wajaaka.

But what a strange anomaly! In Utah the Sego lily, a desert flower, and the cactus grow side by side, while here in Curaçao on some of the driest sites are found orchids growing in profusion on cactus, and in other localities cactus, in standing water, where one might naturally expect waving cocoanut palms in the place of the defiant spiny cactus, which in many places attains the height of twenty feet and extends in unbroken stretches along the north coast for many miles.



A CACTUS LAKE

This unique photograph shows part of the forest of cactus growing in standing water in the Dutch West Indies—a most remarkable thing to see when one has been accustomed to associating this plant with driest of desert surroundings, but we must admit that it is only a temporary condition.



THE CACTUS SWAMP

Swampy expanse of cactus, Curaçao, Dutch West Indies. The region is naturally one of extreme aridity and this apparent phenomenon is explained by the fact that the photograph was taken after a heavy and rare tropical shower.

The explanation, however, for this in this locality is simple, though I venture to say that the same phenomenon in other desert countries is extremely unlikely. Curaçao, an island in the tropics, is one of drought and scanty rainfall. These dry conditions account for the presence of the cactus, but what about the lakes? The pictures were taken during the wet season. Recently, while walking along the north coast of the island from Jofje Aban to Santa Maria, I was caught in a heavy tropical shower. The soil there was very thin and barely covered the coral-limestone rock. The thin covering of soil is just sufficient

for the growth of the cactus, and the coral-limestone rock being practically impervious to water held the precipitation for quite a while, forming in many places small streams and in others large temporary lakes. For three hours after the rain had ceased I had the unique experience of walking through a forest of this giant tree-cactus which underfoot had the appearance of a swamp. The next day all signs of the lakes had disappeared and the desert was as before, with nothing but the braying of an occasional burro or the hawking and screaming of a few parrots to disturb its silence.

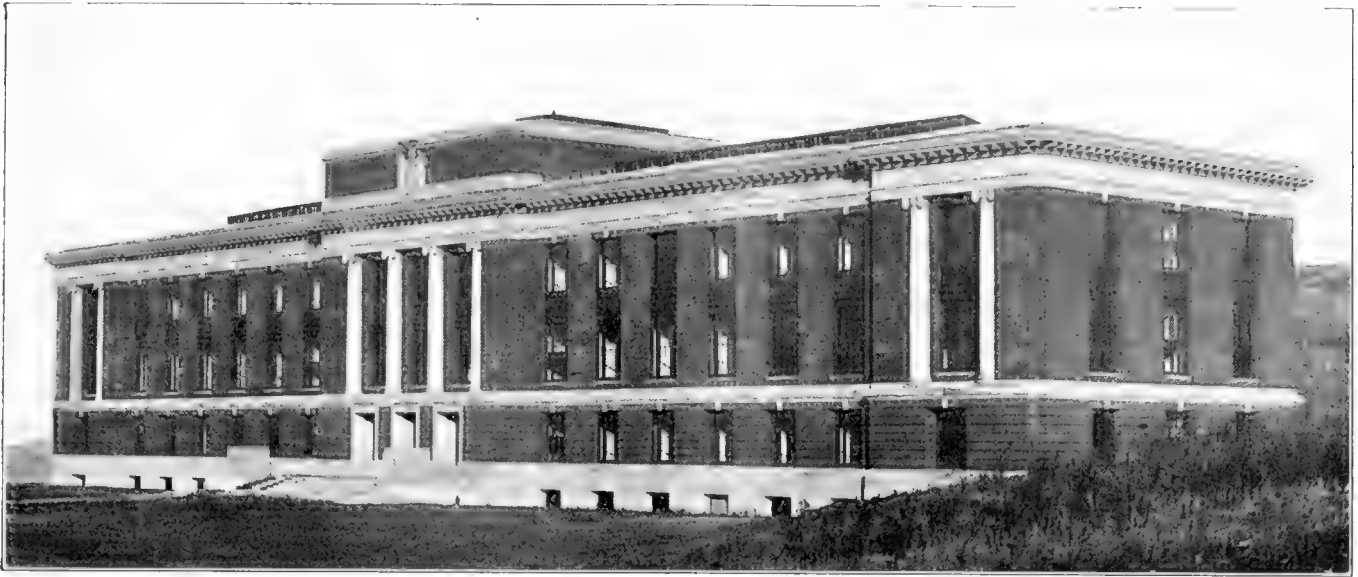
PINE BLISTER IN MICHIGAN

CLOSE on the heels of the Department of Agriculture's quarantine against the shipment of white pine seedlings from areas, where the white pine blister disease is doing its destructive work, to other sections of the country, comes the discovery of the disease in a nursery near Detroit, Michigan. Prior to this time the disease had been widespread throughout the New England states, but has rarely been found much further west.

Federal agents employed by the Bureau of Plant Industry of the Department of Agriculture made the discovery, learning at the same time that the nurseryman had known of its presence for the past six years in a certain lot of imported pine and that a dozen or more diseased specimens had been destroyed during that period. Shipments have been made regularly from this stock, but fortunately the business is largely local, so that the disease has probably not spread greatly through this channel. A complete survey is being made in Michigan to discover and stamp out the disease.

SCHOOL FORESTS ESTABLISHED

ARBOR DAY has been widely celebrated throughout New York State this year by the establishment of school forests. Among the villages which have taken up reforestation work on reservoir sites, undeveloped park lands and worn-out pastures are Fort Edward, where 15,000 red pines were planted on April 12th and 26th; Port Jervis, where the forest started last year in the Elks' Park was extended by the planting of 1,000 Norway spruces on April 19th; Ballston Spa, where the school children put out 1,000 red pines; Randolph, where 2,000 evergreens of various kinds were planted by the pupils of the high school on park land; Newburgh, where, through the coöperation of the public schools and the Chamber of Commerce, 2,000 Norway spruces were added to the forests started last spring on the reservoir lands of the city; Wellsville, where the new waterworks was dedicated on May 11th by the planting of 1,000 forest trees on the reservoir slope, and Ellenville, where 1,000 trees have been planted on land owned by the village.



THE FORESTRY BUILDING AT SYRACUSE

New home of The New York State College of Forestry at Syracuse University, built by the people of the State of New York at a cost of \$250,000, and occupied early last spring.

NEW YORK STATE COLLEGE OF FORESTRY BUILDING

NEW YORK State has taken her place among the foremost states in forestry education by the erection of a beautiful building on the campus of Syracuse University to house the New York State College of Forestry. Under Dean Hugh P. Baker, the college has made rapid growth since its organization in 1911 and has been in urgent need of this new building. Built at a cost of \$250,000, with \$35,000 additional for furnishings, it is said to be the largest and best-equipped structure in the country used exclusively for forestry educational purposes.

It was announced in November, 1914, that the Eastern Forest Products Laboratory would be located in the new building. As soon as the \$20,000 worth of machinery and apparatus can be installed, the college will be in a position to carry on investigative as well as educational work. Wood working, wood distillation, timber testing, timber preservation, and pulp and paper making laboratories will be fitted up and practical courses in these several lines established to train young men as experts.

In point of beauty this building is worthy of some note. Situated on an elevation overlooking the city of Syracuse and occupying an isolated section of the campus of the University, it makes an imposing sight. It is constructed in the Renaissance style of architecture and has three stories and basement. Indiana limestone and tapestry brick are used with very pleasing contrast. A retaining wall of limestone rises fifteen feet above the concrete base and the brick construction is used for the upper portions. The dimensions are 280 feet by 66 feet.

The main entrance is exceptionally spacious and the broad, ornamental granite approach is flanked on either side by huge blocks of dressed limestone, each weighing

nearly two tons. Four Corinthian pillars, of limestone also, are built into the front of the building and support a broad band of the same material in which is carved, "The New York State College of Forestry." Centered above this inscription is a large seal of the State of New York carved in limestone. The window ledges and cornices are also of limestone, carrying out the effect of the contrast between the gray of the limestone and the warm red of the tapestry brick to the fullest extent.

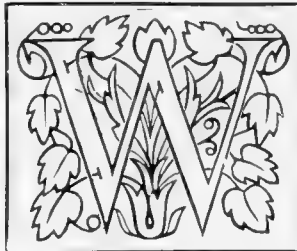
The interior is arranged to secure the greatest convenience possible. A rotunda occupies the center of the building and the corridors run from it lengthwise. The offices of the dean and the business offices radiate from the rotunda, while the departmental heads have offices on the corridors. The lecture rooms and laboratories of each department are grouped nearby. A unique feature of the building is the decorative scheme used in the rotunda. It is finished in marble with massive pillars and into the walls are set specimens of 118 different species of woods, each highly polished to show the grain, and labelled. Stairways have thin marble steps with balustrades of ornamental iron and oak. Floors in all the rooms are of maple.

Everything conceivable in the way of equipment is incorporated in the structure. A big mailing room to handle press bulletins and other publications issued by the college occupies a section of the basement, and lavatories, locker rooms, and shower baths are also located there. A large library with a well-lighted reading room and ample stack space makes study pleasant and convenient. The Forestry Club of the college will also have rooms in the building. An assembly hall with a seating capacity of 300 serves for lectures and for various gatherings.

Forestry for Boys and Girls

by Bristow Adams

THE TREES AND WAR



WITH all the talk of war, and all the need of doing our best to win that war, we can not help thinking of the place that the trees have held, and will hold, in man's strife with other men. It seems too bad that the great, patient trees should have a part in anything so bad as war is. If they have souls, they must be as surely against the crime of warfare as all right-thinking men are against it. I speak of war in this case as I would speak of slavery or of any other crime against humanity that ought to be done away with.

As for the present war, we are in it now, and the only way out is forward. We have got to see it through, and I find, each day, that I feel more strongly than the day before that I should like to be at the front, in the thick of it, that I might help in that way or in any way to make war less likely in the future. Our Congress has stated that we are to take our part for the good of the people of the world, and our President has approved of that course. All of us support our Government in this idea. Our duty is to make it more easy for the everyday folks to say how they shall run their affairs, instead of having these affairs run selfishly by kings, and dukes, and uniforms, and gold-braid, and pride-of-birth, and lust-of-power.

Peace is no less blessed than it ever was, and war is no less cruel. But the first thing right now is to help bring about, even through war itself, a world-wide belief in the rights of the many to make their own rules for the greatest good of the greatest number, as against the wicked selfishness of the few. If all the great nations—and the German people

form a great nation—will come to a belief in what Abraham Lincoln called "a government of the people, by the people, and for the people," then we can be pretty sure that war will cease. And we are fighting now to safeguard that form of government,—Democracy,—in Europe as well as in America.

MY two boys are too little to realize what war means. They would be much pleased to see their father in a uniform, and to have him carry a flag, or shoot a gun, and march away to fight the enemy. The older one is very proud of the soldier grandfather who fought against slavery, and they would be just as proud to have their own father fight against the equally wrong use of power in the present day.


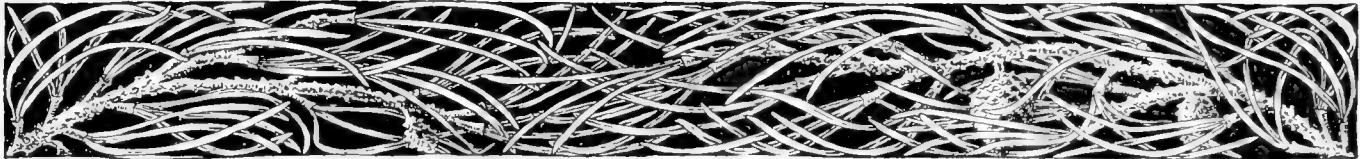
With the girls it is different. They are older, and they know what it might mean if the other fellow shot first and shot straighter, or if a ship were blown up and all those on board were drowned. I overheard one of them a few nights ago, and got about what the eavesdropper is said always to get.

She was saying her prayers, and, as I remember, a part of the prayer was about like this:

"Dear Lord, even if father is right mean to us sometimes when we don't really intend to be bad, please don't let him go away to the war and get killed."

I tiptoed away with some very mixed thoughts.

WE are all trying to do our bit, as they say in England. Early in the morning, and after the day's work is over, so long as there is light, we are gardening to help raise the food that we will need this summer. Even the little boys have staked out tiny plots, and have bordered them with the rough stones that they spaded up. One of the girls was inclined



to find fault with her brother because he was planting flowers, but he said that the flowers were just as nice now as they were before the war began, and I think he is right. I am planting trees and shrubs as well as vegetables. The hedge-row flowers of England bloom untrampled today because some little girls' fathers and brothers are in the blood and mire at the front.

INDEED, it seems to me that the war should not make those at home do any less the things that they always should do; and I am almost sorry that it took a war to make us see that every one should do his part to help serve the world with food and clothing, and other products of the soil. There is nothing that we are doing now in the great gardening campaign that we ought not to have been doing for the past ten years, and that we ought not to keep on doing, with improvements, for the next ten years and more to come.

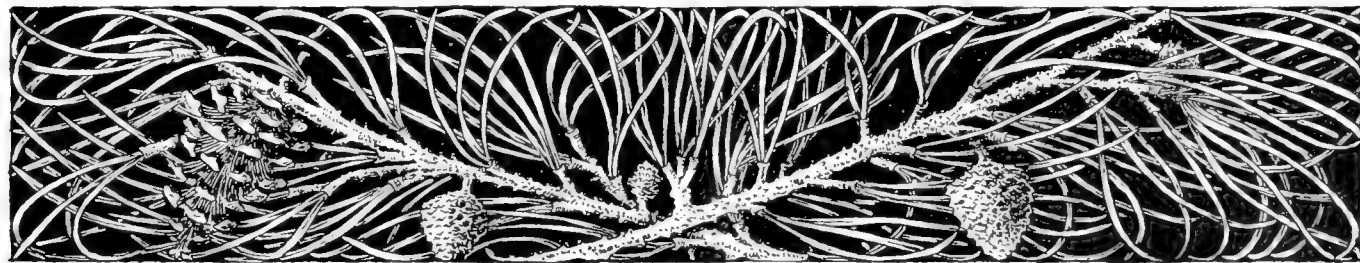
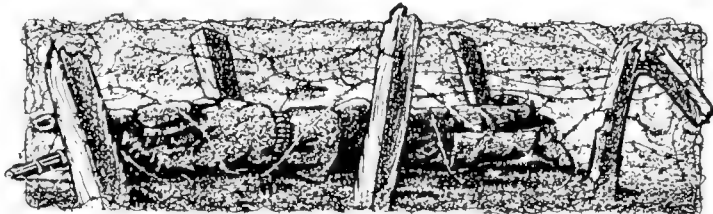
For example, there is more reason why we should plant and care for trees, and protect them from all sorts of harm, than there ever was. We have seen the pictures of the forests of Europe burned and shattered by shell-fire, cut away to make room for cannon, destroyed to go into trenches and stockades, and roadways and bridges, built into barbed-wire entanglements, even supporting that real ring of steel, the barbed fence charged with a death-dealing electric current, that surrounds poor Belgium. If there were truly "tongues in trees," as Shakespeare says, they would be crying out in horror at being put to such inhuman uses.

OUR own trees will have to help make up for those which have been so badly used. Maybe some of ours will be put to the same kinds of purposes. Trees are more important in war than they ever

have been before, even counting the time when the spongy palmetto logs of Fort Moultrie formed such a sure defense against the cannon of the British vessels.

In former times, when the eyes of an army were formed by cavalry, which scouted ahead and brought back word as to where the enemy might be, it was possible to hide whole regiments in deep valleys or ravines, or behind hills and thick woods. Nowadays, with airplanes taking the place of cavalry, all these hiding places can be easily seen from above, except those which have a screen of trees over them. On the battlefields of France today the great batteries are hidden from the scouts of the air by being placed in groves or forests, and where no trees are growing great branches are set up to cloak the batteries.

This is a serious time. It is no time for being nervous and panic-stricken; it is no time for ill-considered action, or for starting new and untried activities or new ways to do things. The great conservation movement, which started with forestry, was never so important as it is now; and if we had seriously heeded its call eight years ago we would now be about eight times as well off as we are today. Its program is as good now as it was then, and its program ever looks to the future, as we must all look to the future. The home gardening of today should not be for this year, but for all years to come, and little that we can do will bring quick results now. Next year there will be even more need for thrift, more need for planting and planning. Let us each do our part as we see it to do, with all our hearts and with all our strength. We must win the fight. Then our forests will be put to good and peaceful uses, and then no little girls should ever have to pray that even a cross father might not have to go away to be killed.





PRactical ENTHUSIASTS WHO DID THE PLANTING NEAR ALTOONA, PENNSYLVANIA

A group of the planters—mostly Boy Scouts—who made such a good record in putting out the little trees on Kittanning Point, part of Altoona's watershed, under the personal supervision of District Forester Ludwig, of the Pennsylvania Forest Service.

ALTOONA'S WATERSHED FORESTED

TROOPS are guarding the water supply reservoirs of most of our cities to prevent poisoning of the water by alien enemies. Fortunate is the city that has taken the necessary measures to insure a pure, even flow of water to the homes in its environs the year around, in times of peace as well as war. The protection from denudation of those lands adjacent to reservoirs or other sources of supply is the essential thing. The ground cover must be retained for its cleansing ability in removing impurities from the water and for its absorptive powers, which equalize the flow. Planting of trees on such lands is the only satisfactory and permanent method of accomplishing the desired end.

Altoona, Pennsylvania, has adopted a broad policy in this connection. In April and May of last year, 30,000 one- and two-year-old seedlings were planted on Kittanning Point, part of the watershed of the city's reservoirs, and

an appropriation has been made to carry on the work from year to year. Twenty thousand seedlings started in plantation last year will be set out this spring. White Pine, European Larch, Scotch Pine, White Ash, and Pitch Pine are being used and the first year's planting shows that ninety to ninety-five per cent are thriving.

The Blair County Game, Fish, and Forestry Association was the first to realize the need of this work and to call it to the attention of the city officials. The Commissioner of Parks and Watersheds immediately cooperated with the organization and the aid of the Boy Scouts in the section was secured. Most of the actual work of planting was done by the boys and they made a good record for themselves by setting out 18,000 trees in one seven-hour day. The trees were furnished by the State of Pennsylvania and the work was superintended by District Forester Ludwig of the Pennsylvania Forest Service.

HAWAII'S EFFECTIVE LAWS

HAWAII has now had her 798,344 acres of forest preserves under the control of a Division of Forestry for a year and the rules in force have worked out very well. The law, passed in April, 1916, provides penalties not to exceed five hundred dollars in amount for violations of its provisions, which are based largely on the regulations in force in the National Forests administered by the United States Forest Service.

The cutting, killing, removal, or injuring in any way any tree, the grazing of any animals or the hunting of any wild animals on forest land under the control of the Division of Forestry, is prohibited except as authorized by permit from the Superintendent of Forests. The wilful dis-

turbance or defacement of signs, survey monuments, or marks of any kind, the destruction of property of any kind, the leaving of refuse which will render the forest unsightly or pollute the waters of the forest, and "squatting" on government land or erecting any sort of construction except as otherwise allowed by law are all punishable by fine.

More than 250,000 acres of the 798,344 under the control of the Forestry Division are privately owned. C. S. Judd, Superintendent of Forestry for the Territory of Hawaii, and five Forest Rangers appointed by him, make up the organization which is effectually caring for the Hawaiian forests.

EDITORIAL

THE FOOD GARDEN AS A CHARACTER BUILDER

THE main business of life is to learn how to live. How few of us choose wisely in what we strive for! Experience and results are the only sure tests of value. Yet our standards must be fixed, and our ideals formed largely before we are fifteen, when the wisdom of our elders too often seems dry as dust and overcharged with caution. To the typical young American pleasure and amusement appear not as relaxation from duty, but too often as the chief aim in life. And too often, also, overindulgent parents seek only their children's happiness, and themselves forget that contentment can come only from a normal balance between work and play.

The American boy, especially the boy who lives in the city or small town, either has far more time for play than is good for him, or else he is employed at routine labor in which he has no interest, and which robs him of his youth and initiative. Every child should be encouraged to undertake some constructive task in which he can reap the fruit of his own exertions.

A vegetable garden is a golden opportunity for the development of character. The youth should be given his own plot of ground, and, if possible, he should buy his own seed, make his own choice of crops, guided by a word or two of advice—and, above all, he should receive market prices for the products which he raises, paid in cash by his parents or neighbors, on delivery. Many farmers' sons forsake the home place for poorly paid positions in the city, not because of the drudgery of the farm, but for the sole reason that they are given no tangible return or personal interest in the product of their labor. Most city boys grow up in the densest ignorance of that partnership between man and nature, the cultivation of the soil, upon which rests the prosperity of any nation. The planting, tending and harvesting of a crop of vegetables, and the final real-

ization of a money income from its sale, teach the young proprietor perseverance, responsibility, and initiative and the greatest lesson of all—the fact that success in actual business undertakings is attained only by continuous attention and industry. Such an undertaking will help to overcome the desire to make money by trickery and without exertion—an idea so often absorbed by young people to their ultimate undoing. The boy who will forego his pleasures when the garden needs weeding and who will carry through his enterprise can be trusted to make good in other fields of endeavor which have nothing to do with agriculture. His outlook, too, is permanently broadened and his interest in life increased. But a child must have incentive for what he does. Patriotism has a strong appeal to the young and the thought that in this way he is actually helping our nation to win the war for human liberty will be a powerful motive for the undertaking. But boys from eight to twelve years old cannot be expected to grasp the abstract idea of service for the sake of principle, when the effort is shorn of all tangible rewards and mother simply appropriates the results for the family dinner table. Parents will do well to remember that the few dollars which they may be called upon to pay to the boy, when he proudly offers them the products of his own garden, are worth many times their value in character building.

The greatest good is accomplished with youths under twelve to fourteen. These little fellows cannot very well prepare the soil as thoroughly as it should be done; the initial spading should be done for them by some older person. A plot of ground as small as 10 by 50 feet will yield produce worth as much as \$20.00, and a boy can easily care for this much ground. Has this aspect of the food garden ever received from American parents the attention it deserves?

PROCRASTINATION IN INDIANA

DURING the fall of 1916 the American Forestry Association endeavored to point out to the people of Indiana the reason for the almost complete failure of the state forestry law to secure efficient results. This law has been in operation for twelve years. In its general plan of organization it followed the pattern of those states which have been successful in forestry—in that a State Forestry Board was created, composed of five men chosen for professional or personal interest in the subject.

But there was one fatal defect—this board was not given control over its own agent. The secretary, who was intended as the executive and forester, and who should have been appointed by the board and been under its direct oversight, was instead made a member, of equal authority with the others, and was appointed by the Governor.

It would have been possible for the Governors of the state to have appointed to this position men of the proper professional training in forestry, without which progress and initiative are practically impossible. The law even required that the secretary should have forestry training. But out of three appointees, each holding for four years, only one had even a rudimentary knowledge of trees from a botanical standpoint, and the last appointee, whose term expires July 1st, was frankly ignorant of the entire subject.

A vigorous effort was made in the legislature this last winter to remedy this defect by giving the board the control of its own affairs, but the bill failed of passage, thus permitting the old and discredited plan to remain in force for another term. The Governor has appointed as secretary a public-spirited citizen, who has no professional knowledge

of forestry, and who has recognized the fact by appointing as his deputy a former secretary, the only one whose work was worthy of commendation. It is probable that under this management the Forestry Department in Indiana will make a reasonably good showing in the next four years.

But the real question is not settled. The state is no further ahead than it was in 1908 when this same acting secretary was appointed—only to be replaced in 1912 for purely political reasons.

Only one plan has ever stood the test of time and ex-

perience, in state forest organization, during the 20 years or more since the movement started—and that is the creation of an independent forestry board entrusted with the direction of state forestry affairs, *empowered to appoint the state forester*, and required by law to secure a trained man. Until Indiana comes to recognize this principle the state may look forward to future setbacks and upheavals and to an indefinite postponement of the solution of several great economic questions in forestry whose urgency will become more evident with every year.

THE NEED OF SMITH-LEVER EXTENSION WORK IN FORESTRY

THE American Forestry Association has already called attention to the opportunity given to the various states, under the terms of the Smith-Lever law, to provide extension work in forestry among the owners of farm woodlots. So far this field has been almost entirely neglected. The states are rapidly building up their agricultural field forces, consisting of county agents, and are expending sums ranging around \$50,000, which are duplicated by the Smith-Lever law from the national treasury—yet, with one or two exceptions, not one cent of this fund is being used to instruct the farmers in the proper care and development of the woodlot. This cannot be due to the lack of recognition of the value of the woodlot, windbreak and shelter belt on the farm—for as far back as 1876 Minnesota founded a state forestry association to encourage the planting of trees on prairie farms. Its only adequate explanation is the lack of proper organization or aggressiveness on the part of the state educational forces which are responsible for the spread of forestry information. Where no forest

school exists, the agricultural leaders, following the lines of greatest interest or least resistance, simply develop their own work and forestry goes by the board. Where forestry is taught, especially at the state agricultural colleges, it should be possible to arouse the interest of those who must pass upon the expediency of providing extension work in this line. Yet in many instances this has not been done.

There is only one method which promises any degree of success, and that is the employment of a specialist, a forester, to devote his time to the state woodlot problem. County agricultural agents may be relied on to speak a good word for forestry as occasion permits—but never to give it the attention and skilled guidance which it demands.

Every state should without further delay make suitable provision for the employment under the Smith-Lever law of a specialist on woodlots. Considering the urgency of the need for this work, and the wonderful opportunity presented by this law, it is simply astonishing that this has not already been done.

A GREAT FORWARD STEP BY MINNESOTA

THE state of Minnesota has set aside for state forests an area of over 300,000 acres of state lands. This tract is composed of scattered sections and "forties" of land, a part of a much greater area of similar character lying in northeastern Minnesota. The National Government had previously set aside over a million acres in this region as a National Forest.

Northeastern Minnesota, in the northern half of Lake and Cook Counties, is a granitic area of outcropping rock ledges, shallow soils and innumerable lakes and water courses. It is the southern extension of a similar great area in Canada. This region is filled with moose and deer, which thrive under the dual protection afforded by the lack of wagon roads or railroads in the hunting season and the establishment of a game preserve or refuge by the state. Fire has caused great havoc, but there still remains much beautiful pine, spruce and cedar along the lake shores. If the region can be protected from fires and the lake shores preserved in their natural state, this portion of northern Minnesota is destined, within a few years, to become the greatest public playground in the middle West, rivalling Maine in attractiveness, climate, and accessibility.

In setting aside these state lands to be administered as state forests, Minnesota has insured the fullest protection and development of the recreational features of the region, and has rendered an inestimable public service to the entire country, but especially to the Mississippi Valley. This legislation is the first result of the constitutional amendment passed in 1914, by popular vote, which gave the state legislature the power to classify state-owned lands as agricultural or forest land. This victory for sound economics, a wonderful demonstration of the progress of popular education in forestry, was deeply resented by the speculators in cheap lands, to whom all lands have a possible sale value, whether they are in reality agricultural or not. Opposition arose in the legislature, the first fruits of which were the crippling of the State Forest Service by reducing its appropriation. Then followed the attempt in the legislature of 1916-'17 to destroy the independence and integrity of the State Forest Service altogether, under color of fusing it with lands and immigration in the proposed Public Domain bill.

Not only was this entire bill defeated, largely as a result of this attack upon a department which was unselfishly working for the preservation of Minnesota's great

timber resources—but the people's confidence in this department was further manifested by entrusting it for the first time with an adequate area of state forest land.

The time is rapidly passing in our various states when state property in land, timber and other natural resources can be neglected or mismanaged with impunity by officials imbued with the ideas of partisan politics—and the era when such property can be stolen outright belongs to the recent past. But the public has yet to learn that the management of such property is a business which requires stability of policy, the retention of expert managers, and the elimination of the "spoils system," even though the latter

be euphemistically termed "responsibility to the people." State forest property must be kept in the hands of trained state foresters and managed on the merit system. Minnesota has had this system since 1911, and when the people of Minnesota realize that the proper development and protection of their 300,000-acre playground depends upon continuing the efficient and non-political organization of the State Forest Service, under the State Board of Forestry, there will be less chance in the future than there was this year that they will permit legislation jeopardizing their heritage of forest and lake front, that is destined to become the most prized possession of generations yet to come.

A BACKWARD STEP IN VERMONT

VERMONT has abolished her State Forestry Board and subordinated her State Forestry Department to the Commissioner of Agriculture. Incidental to this change, both the state forester and the assistant state forester, comprising the technical force of this department, have resigned.

This upheaval in Vermont presents vividly the struggle between the old and the new ideals in state government in this country. We have stated repeatedly in these pages that state forestry cannot be efficient as a part of the partisan political game as it is usually played. An attempt to do any effective work in fire protection, the rational management of forest lands, especially if state owned, and public education in forestry if entrusted to politicians without professional training is worse than a waste of time, for it will bring forestry into disrepute among the unthinking public.

Vermont made a good beginning in state policy ten years ago, when the State Board of Forestry was established and empowered to appoint a trained forester. They secured and retained until the present year one of the most capable and experienced foresters in the country—a man whose reputation amongst the profession is above reproach. Under this forester the work in Vermont forged rapidly ahead. A state-wide system of fire protection was organized, planting increased rapidly and a policy of purchasing state forests was begun, which promised in time to yield great results as demonstrations of forestry practice.

But close students of state organization have realized that forestry in Vermont was all this time resting upon an unstable foundation, and was after all at the mercy of the strong political machine which for generations has controlled the destinies of this rock-ribbed New England community. The board which had the appointive power was composed of four men, only one of whom was a scientist. Of the other three, the Governor was one, and the Governor appointed the remaining two.

Forestry was originally taken up by a number of men prominent in political life in Vermont, with the sincere purpose of benefiting the state. Under their encouragement the department was launched and was given the needed support. But this was autocracy. Sooner or later the will of these rulers was bound to clash with the interests of the

public—and that is just what happened. A prominent citizen bestowed a tract of land upon the state to be managed as a state forest. Another prominent citizen suggested the name of a retainer for custodian. The retainer was appointed. It shortly developed that the state forest was being run, not according to the ideals of practical and economic forest management, but for the dual purpose of carrying out the personal ideas of the donor and of providing a permanent job for the henchman. To the student of the spoils system in American politics it will not appear surprising that these overlords of an American commonwealth decided that a technical expert who refused to consent to the retention of an incompetent assistant should therefore be gotten rid of, even if in the process it were necessary to tear down the entire department.

Efficiency and party politics are absolutely incompatible. The two cardinal principles of efficient organization are, first, that the man directly responsible for the job shall be qualified to perform the duties required of him, and, second, that he be given the power to select and remove and to oversee and control the subordinates required in carrying out this work. The latter principle was grossly violated, and as a result the state forester resigned and the department itself was reorganized out of existence as a penalty for this insubordination.

The new law provides that the commissioner of agriculture shall act as state forester, in addition to serving as state nursery inspector, director of the agricultural schools of the state, cattle commissioner, and state ornithologist. An amendment, not contemplated by the original law, but secured by the friends of forestry, reads that he must appoint a deputy who shall be a professionally trained forester. The commissioner has the power of apportioning the funds to be spent for forestry, and makes all appointments. The deputy of forestry, therefore, has no real authority, but is a subordinate, from this time forth, who can be expected to give no further trouble. The custodian whose retention precipitated this issue between personal government and business efficiency still holds his job.

AMERICAN FORESTRY calls attention to this situation because of the deep significance of the events described. There are many who claim that state governments in this country do not possess the elements of stability necessary

for success in establishing, and maintaining a state forest policy, and that efforts in this direction are a waste of time. This is not the attitude taken by the Association. We believe that it is possible to establish firm and lasting state forest policies, provided the people of our state commonwealths will recognize the absolute necessity of divorcing forestry from politics, and the means by which it can be

done. We hope that the results of the ten years of constructive work in Vermont will not be lost, and that at some future time the independence and stability of the department will again be established on a much surer foundation of popular enlightenment, rather than the fickle favor of a few powerful men who still worship ancient ideals of government.

STOCK LOSSES AFFECT FOOD SUPPLY

AT this critical time when the world is approaching a period of short food supply, reports from the West show that the severity of the past winter caused serious losses among the cattle and sheep on the ranges. Stockmen throughout the West say the winter was unquestionably the worst they have experienced in twenty-five years. On the Pacific Coast its equal has not been suffered for fifty years. Where the snow generally does not cover the range until the first of February and is gone by April, the middle of last December saw the ranges buried so deep that the animals could not get the forage, and storm after storm followed, with no opening up until the middle of May. For the average six weeks or two months period when the range is deeply covered by snow, the stockman feels safe if he has a ton and a half of hay for each animal. With that period stretched into five months, practically tripled, the usual ton and a half of feed was absolutely inadequate and many animals died of starvation.

In the Southwest the winter was unusually open, which will be about as bad for that section as the heavy snows were for the other sections of the West. While the heavy snows cover forage, their melting gives much-needed moisture to the soil and an abundant grass crop is the result. In the Southwest the absence of snow means absence of forage and starvation for thousands of animals.

Even with the plains now open and an abundant forage crop assured over the greater part of the grazing area, the losses are by no means over, because the season is so late. The plains forage is counted upon to keep the animals in feed until the summer ranges in the mountains are ready, but the fact that these feeding grounds will be six weeks late in bearing a crop of forage grasses means that there will be another feedless period between with resultant losses.

The United States Forest Service, which controls most of the summer feeding grounds in the mountains, as they are located in National Forests, is doing everything in its power to relieve the situation. As soon as the gravity of

the situation was appreciated, telegrams were sent from the headquarters at Washington, D. C., to all District Foresters and Supervisors ordering them to let all the stock that could be fed on to the summer ranges and to do it as soon as the forage was in condition. This may result in some overcrowding of the range and a shortage later, but the need is so great that the chance must be taken.

An idea of the total shortage in the meat supply which will result from the losses can be gained from the following figures: There are normally a few less than fifty million cattle on the western ranges. Of these ten or twelve million are beef cattle. In the average year 500,000 calves are grazed on the National Forests, but figures show that this number will be reduced probably twenty per cent. A reduction this year of one-fifth of the total beef supply will be the result, and next year and the following it will be even more marked, because the steers pulled through the bad year while the cows died off, and the future as well as the present calf crop will be thereby cut down. The sheep losses are much greater than those among the cattle; but, being fast breeders, they will more quickly reach normal numbers again. About six million lambs are grazed in the National Forests on an average, but this year it is estimated that the total will be nearer four million. Only thirty-five or forty per cent of the ewes will have lambs, about half as many as usual, and the result will be a reduction of about one-third in the mutton supply.

Averaging the losses, it is evident that the beef and mutton output will be reduced approximately twenty-five per cent this year, with several lean years ahead, especially in the beef supply. Two years ago Australia lost twenty million sheep, and conditions are as bad or worse in the other grazing regions of the world, so the United States cannot depend on a foreign meat supply and must work out its own salvation. The agitation for economy and conservation in handling food needs no stronger argument than this to prove its case.

ALARGE number of schools in New York State have taken advantage of the offer put out by the New York State College of Forestry to furnish plans free and shrubbery at cost for the improvement of school grounds. Among the villages which have celebrated Arbor Day by putting through landscape improvement plans are Camden, Canastota, Peterboro, Fulton, Clayton, Remsen and Belmont. Plans are under way for several other villages.

THE President has issued a proclamation eliminating 40,160 acres of mineral land from the Crook National Forest in Arizona. A large part of the area is covered by mining locations and there is practically no forest cover. The land has no value for watershed protection. By the same proclamation some thirty-four thousand acres of rough mountain land of no agricultural value are added to the forest.

SAVE THE FRUIT CROP

**We said this LAST YEAR—
We say it again**

This is a year for thrift and service. We must feed not only our own people, but also millions in Europe. The frightful waste of fruit is a national reproach. Help stop this unpardonable extravagance. The fruit we waste would feed Belgium.

THE United States Government urges preserving as a home duty. Preserved fruits are energizing and nourishing. They vary your menus. They reduce the cost of your table.

America's canning and preserving industries are models for the world. Their products are pure, appetizing and wholesome. Support them.

If you preserve at home, put up more fruit than ever before. Get jars and glasses, bottles and crocks ready to save the fruit crop. Put away dried vegetables. The American housewife who practices thrift places herself in the ranks of those who serve their country.

You can show your thrift in no more convincing way than by combating the national tendency to squander this country's wonderful fruit crop. Whether you buy preserved fruits from your grocer or preserve at home you perform a service to your own family and to the Nation.

American Sugar Refining Company



"Sweeten it with Domino"

Granulated, Tablet, Powdered, Confectioners, Brown

Domino Granulated Sugar is sold in convenient-sized bags and cartons

The increased cost of preserving because of the higher price of sugar is less than the increased cost of most other foods

Coal Companies Protect Forests

Organization of the Forest Protective Association for the hard coal region of Pennsylvania has been completed, and application made to Chief Forest Fire Warden Wirt for a form of charter. The following officers have been elected:

President, H. C. Mason, of the Lehigh and Wilkes-Barre Coal Company; Vice-President, A. C. Neumiller, forester for the Lehigh Coal and Navigation Company; Secretary and Treasurer, H. C. Wiener, forester for the Lehigh Valley Coal Company. Directors: H. B. Fell, of the Wyoming Valley Water Company; L. W. Conrad, of the P. and R. Coal and Iron Company; H. A. Christian, of the New Jersey Zinc Company; E. A. Pettibone, of the D. and H. Coal Company; Col. James Archbald, Superintendent Girard Estate; P. W. Lance, of the Spring Brook Water Company; and R. C. Coombe, of Tamaqua.

The charter will be modelled after the one under which a similar association is now operating in the Poconos. The association will operate over about 500,000 acres of forest land, covering practically all of the anthracite region between the Susquehanna and the Schuylkill.

Under Forestry Management

The Empire State Forest Products Association, made up of prominent New York lumbermen and paper manufacturers who control a total area of one million two hundred thousand acres of timberland in that state, has decided to establish a rational and constructive system of forestry for handling these lands. The first step taken was the securing of Professor A. B. Recknagel, of the Forestry Department at Cornell University, as forester. He has been given a year's leave from his duties at Cornell and will establish headquarters for the association at Albany, starting the work at once. In taking up this work, Professor Recknagel will have the benefit of years of practical training and experience in similar work for the government in the United States Forest Service, coupled with four years' experience in teaching forestry at Cornell University. He has specialized in forest management and is the author of a book on "The Theory and Practice of Working Plans," the second edition of which has recently appeared from the press of John Wiley and Sons, of New York. He is a graduate of Yale University in the class of 1904 and of Yale Forest School two years later. Subsequently he spent a year in study and travel abroad.

Levison Resigns

J. J. Levison, B.A., A.F., has resigned his position as Forester of the City of New York to give all his time to his private practice as consulting landscape

forester and arboriculturist. Mr. Levison has been associated with the park department of Greater New York for the past eleven years and has been instrumental in improving tree conditions there. During the past few years he has written a good many interesting articles on tree conditions for *AMERICAN FORESTRY*.

State Game Protection

"New Mexico Game Protective Association wins fight for a 100 per cent game warden," is the terse way Robert E. Dietz, Secretary of that Association, sums up the results of the campaign of New Mexico sportsmen to save the fast dwindling game supply through honest, competent handling. The campaign lasted over six months and resolved itself into a running fight between the sportsmen and hostile political influences. Public opinion was so thoroughly stirred up and the Association's position was so irrefutably sound, however, that the appointment of a competent warden, "skilled in matters pertaining to fish and game" as the state law requires, was secured despite the opposition.

"Heretofore we have had more law-breakers than game," says Mr. Dietz. "Now we hope for sudden failure of the crop of game hogs and a chance for the game to come back."

A Forest Play

A picturesque and appealing little play for children is "The Spirit of the Forest," by Miss Margaret Dadmun. It not only furnishes fun and entertainment for a cast of from forty to fifty little ones, but carries a real lesson in conservation which, presented in this way, is bound to be effective and to make its indelible impression, not only on the audience but on the players as well. It is written around Gerta, a little peasant girl of ten, and Wilfred, her brother, a little older, and their experience in an ancient grove of trees suddenly enchanted by the Spirit of the Forest—a fairy and her attendant train, who gives to each tree a voice to speak and tell of his love and special service for mankind—a service repaid by neglect and cruel destruction, as the lines go on to say, until the eyes of man are opened by the lack of rain and the drooping and death of the trees, since the Raindrops come no more. Their King—the mighty oak—is slain and felled by man, and the Trees have given up hope when the Spirit of the Forest returns, bringing the Raindrops and Sunbeams, Fairies and Elves with her—and new life to the forest through the Little Oaks which spring up from the freshly moistened earth to carry on the work of serving man. The costuming and grouping of the children in the various parts is very effective and is made more so by the interpolation of appropriate musical selections to carry along the spirit of the play.

We like "The Spirit of the Forest" and wish to congratulate Miss Dadmun on her work. We shall be glad to refer inquiries regarding it to her, and hope that it will be widely read and used.

Liberty Trees of Andorra

That the graceful wistaria which adorns so many of the lovely homes in Germantown, Chestnut Hill, and Mount Airy, Philadelphia, traces its origin, together with quaint Wistar Street, to Richard Wistar, founder of the large Andorra estate, is probably unknown to many of the residents of this charming suburban section, and it is also probably a little known fact that clustered around the name Andorra are some of the quaintest legends of the Pyrenees. Particularly interesting to patriotic Americans is the story that the natives of Andorra plant in their public squares, not flag-poles surmounted by flags, but trees which they call "Liberty Trees." In these days of conservation in every department of animal, horticultural, and agricultural activity, too much emphasis cannot be placed on the importance of tree planting. "Arbor Day" comes only once a year, and too little publicity is given this subject. Trees, ornamental and comforting as they are, are most valuable as conservers of soil moisture. Potato planting in these days of national crisis is undoubtedly a patriotic act, but a closely related task is that of tree planting, and it would not be a bad idea to supplement the popular liberty loan with the planting of liberty trees.

Foresters Enlist

At the present time the New York State College of Forestry is represented in the different branches of the Army and Navy to the following extent: Six men have enlisted in the Naval Reserve Corps; ten have seen Border Service and are still with the Cavalry, Infantry, or Artillery Service; seven have enlisted in the above branches since the outbreak of the war, and between 40 and 50 will attend the Officers' Training Camp at Madison Barracks, New York.

The College also maintains a company in the Syracuse University Regiment. Professor H. B. Waha is captain of the company, and the other commissioned officers are Professor R. P. Prichard and Professor H. H. Tryon.

A Course in Lumbering

A short course in lumbering, designed to meet the demand for a brief and practical training with special emphasis on the engineering aspect of the subject, has been inaugurated at the Georgia State College of Agriculture at Athens, Georgia. It prepares men for such positions as cruiser or surveyor, yard boss, scaler, or woods foreman with lumber companies, or for the position of Forest Ranger in the Government service.



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“Some twelve or fourteen years ago while visiting at my sister's summer home at Mamaronock, N. Y., I saw your father with a very large corps doing tree surgery on that place. It impressed me so forcibly and, in later years, the results were so convincing that, upon the purchase of this place, I concluded to have your company do such work as was necessary here. The work has been entirely satisfactory.”



JOHN DAVEY
“Father of Tree Surgery”

BOOK REVIEWS

The Way to Study Birds, by John Dryden Kuser. G. P. Putnam's Sons, New York and London. Price, \$1.25.

The dominant thought of the reader of this book is that it was written by one in whom the love of birds is inherent. Mr. Kuser treats the birds as his intimates, with a familiarity born of close association and sense of comradeship. He knows their ways, their haunts, their individuality and their music. He knows when, where, and how to find them, and his book shows that he knows how to make them his friends when found. In short, the volume may well be accounted an important addition to bird literature.

Fundamentally, the author has sought to make bird identification a simple matter for the non-expert. He recognizes that information on this subject has not been easily available to the beginner in bird-study. His aim has been to supply this information in simple terms and to make it unnecessary for the student to wade ignorantly through a complicated mass of terms or descriptions or to go bird-hunting without the remotest idea of what he may expect to find or how to know when he has found it. With this book as a guide the beginner may attain acquaintanceship with a number of the bird species and acquire a good store of knowledge as to their habits. While intended more as a course of study than a book of reference, the volume is valuable along both lines.

Of the birds found in the neighborhood of New York the book describes 50 species and gives suggestions and information that will make possible identification of others. The data include haunts, description, field-marks, size and shape, song, seasonal abundance and comprehensive remarks as to individual characteristics. It is in these "Remarks" that Mr. Kuser gives the impress of his own bird-loving, and no student of our feathered neighbors can afford to miss the liberal education afforded by the ownership and study of the book.

"The Origin of the Lumber Industry," by William Compton, Ph.D. American Lumberman, Chicago.

Mr. Compton is a member of the Federal Trade Commission. The book contains a vast fund of information, presents a balanced view, ethically speaking, of the lumber industry, and it develops much that has been poorly understood in the economics of that industry. No publication comes to mind in which so many significant facts relating to timber and the lumber industry are brought into so small a compass. The census figures for

production of lumber from 1850 to date, the figures on sawmills, their number, capacity, and capitalization, the history of production by regions, a summary of the timber resources of the country, an insight into the degree to which timber ownership is now concentrated, and the figures on stumpage, past and present, are all connected in a logical fabric embracing the most timely and important problems and tendencies in the field. The big feature of the work is his development of the relations of price. Under his handling that appears as the crucial point of the whole matter. Quantity and quality granted, the desire or necessity of the people is expressed in price, which varies with the economic demand and other factors. Local exhaustion of timber supplies, separation of producing from consuming centers, and increased freight charges are a few of the factors affecting price. The lumber trust bogey is put to rout through a picture of the competition within the industry and a broad study of the history of lumber prices, which, although showing apparent increases, involve a slight relative loss from 1907 to 1913. Compton concludes that "natural influences furnish adequate explanation of lumber prices." The book is professedly an economic one strictly and as such can be read with much profit by the lumberman, the forester, and the conservationist.

"Evergreens, How to Grow Them," by C. S. Harrison, President of the Nebraska Park and Forestry Association. 95 pages, 19 illustrations. Webb Publishing Company, St. Paul, Minn.

This work is written chiefly to aid the farmers of the prairie States in the selection and care of evergreens which will produce lumber, prevent erosion, and beautify the treeless landscape. Brief descriptions of adaptable trees, facts on how to raise them from seed, transplant them, pack them, ship them, etc., make the book practical. At the same time, the numerous illustrations and the well-worded descriptions of scenery, through which the author sprinkles paragraphs which show a broad vision and idealism, add a touch of æsthetic interest.

"Georgia Forest Trees" has been chosen as the title for the annual publication of the Forest Club of the Georgia State Forest School, Athens, Georgia. It lists seventy-six trees native to Georgia, giving a short description in each case, covering the distribution, form and other characteristics, nature of the wood, and its uses. Being dedicated to the school children of Georgia, it should prove useful in advancing the cause

of conservation of Georgia's forests by "installing in them a deep and lasting affection for nature."

The Book of the Peony, by Mrs. Edward Harding, published by J. B. Lippincott Company, Philadelphia and London. Price, \$6.00 net.

This is the only book on this well-known and greatly loved flower, and being such it is complete, practical and beautiful. As a printer's production it is a work of art. It has twenty illustrations in full colors and twenty-two in doubletone. The history and the development of the peony are presented by Mrs. Harding in a delightful manner. She deals specifically with each variety, and gives so much practical information and instruction that the lover and the grower of peonies will find the book unusually profitable.

Forest Fancies, by Lucy C. Kellerhouse. Duffield & Co., New York. Price, \$1.50.

Here are seven charming stories of the life and trees of the forest told delightfully by one who knows and loves the trees and woods. The stories are illustrated with twenty-four full-page prints excellently done. The book is one which should appeal to every lover of the forests.

The *Forestry Annual*, issued by the Forestry Club of the Michigan Agricultural College, East Lansing, Michigan, has just made its appearance for the second time. Attractive in form and make-up and filled with varied and valuable information, it makes a strong bid for the "attention and interest of the student body, alumni, and friends of M. A. C. to the continually widening field of forestry." The large number of forest schools that are issuing annuals of this nature, and the work being done by the students themselves, gives an indication of the keen interest with which young men are entering the forestry field. The future of forestry in his country is safe in the hands of such men.

The third annual number of the *Empire Forester*, published by the Forestry Club of the New York State College of Forestry at Syracuse, N. Y., is a fine piece of work. The policy of its board to largely confine the material in it to student articles on popular phases of forestry, or written in a popular way if technical, gives it an appeal that is not limited to men in the technical field. The selection of a cover design of real artistic value, the use of high-grade cameo paper and duotone ink, the numerous and well-selected illustrations and the evidences of careful editing show expenditure of both money and brains. The editors are to be congratulated.

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North Carolina's Losses

North Carolina suffered a loss of over three and one-half millions from forest fires in 1916, according to advices from the Forestry Division of the State Geological and Economic Survey. For the seven preceding years the damage had averaged about \$620,000 per year, making the 1916 losses about six times greater than the average. The area burned over reached a total of 977,000 acres with the consequent destruction of about 248,000,000 feet of timber. The greatest portion of the financial loss was in the destruction of the by-products of the forest, as North Carolina produces large quantities of turpentine and naval stores.

"In spite of figures of such magnitude," the report continues, "the Legislature adjourned without making any appropriation whatever to prevent fires." Measures which would gradually but surely reduce the annual waste have been recommended to each successive General Assembly, but so far no definite, constructive action has been taken. The forest fire law, recommended and endorsed by the Survey, the North Carolina Forestry Association, and the United States Forest Service, was passed two years ago, but no funds were appropriated to put it into effect, which failure effectually ties the hands of the conservationists.

The protection of young growth as a remedy for the high cost of pulp and paper is being agitated, but so far as reports show there is no real progress toward a constructive method of handling these rich and important resources of the State.

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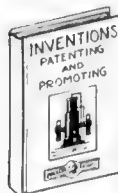
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CANADIAN DEPARTMENT

ELLWOOD WILSON

SECRETARY, CANADIAN SOCIETY OF FOREST ENGINEERS

During the past month the last important section of Forest land in the Province of Quebec was organized into a coöperative fire protective association. The timberland owners of the section lying north of the St. Lawrence River, from the St. Maurice River east to the River Laval and north of Lake St. John, formed a coöperative association, to be known as the Laurentian Forest Protective Association, and chose for their Manager Mr. R. L. Seaborne, who was for several years a district inspector for the St. Maurice Forest Protective Association. This association will protect about 20,000 square miles, covering some of the most valuable timberlands in the Province and owned by some of the most important paper and lumber companies. Among these Price Bros. Co. are the largest limit holders in Quebec. Hon. William Turner is the President and Mr. Kern, of the Donnacona Pulp and Paper Co., is the Vice-President and Mr. Paul G. Owen, the Secretary-Treasurer. There are now four of these coöperative associations which practically cover the most important timbered areas under license from the Government, the Ottawa, the St. Maurice, the Laurentian and the Southern St. Lawrence, and these

have all joined themselves into a federation, called the Quebec Forest Protective Association, which will have charge of all matters of general interest and will handle the necessary literature and propaganda work and also matters with the Provincial and Federal Government Departments.

The Laurentide Company, Limited, in its planting operations this summer will plant about one million trees.

The Riordon Paper Company, Limited will plant about two hundred and fifty thousand trees in the neighborhood of St. Jovite.

Robson Black, Secretary of the Canadian Forestry Association, has just completed a very successful lecture trip through the Prairie Provinces and British Columbia, where he has succeeded in interesting the Government Departments concerned in fire protection in introducing legislation requiring permits for the setting of clearing fires at any time during the summer months. Now that the Prairie Provinces have taken this action only New Brunswick and Nova Scotia need to come into line. If all goes well Canada will soon have adequate protection against forest fires from coast to coast, which will be the most important step in the conservation of our natural resources.

The forest survey of the Province of New Brunswick is making satisfactory progress and is being carried on economically and thoroughly. The outstanding fact demonstrated by this survey is the great fire loss in the past and the necessity for a rational and efficient fire protection service for the future.

The Quebec Forestry School students are about to go into their spring quarters for their field work at Burrill's Siding, where they have a thousand acres of land on which they can practice surveying and get experience in silviculture and different methods of lumbering.

The Research Council of Canada has decided to set aside one hundred square miles in the Petawawa Military District in Ontario. A sufficient grant will be made to carry out a thorough survey of this area next summer, the work to be done by the Dominion Forest Branch. Beyond the survey a program has not yet been prepared. The Research Council for Scientific and Industrial Work in Canada has been formed for the purpose of ascertaining and tabulating the various agencies which are now carrying on research work in universities and colleges, in Government laboratories, business organizations and industries, scientific associations or by private persons; also to ascertain the lines of work being done and the facilities and equipment and especially the man-power available for such

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors, and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.*

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work; to coördinate all agencies, to induce coöperation and prevent overlapping, and to bring about a community of knowledge; to study the problems which confront our industries and to link up the resources of science with labor and capital so as to bring about the best possible economic results; to make a study of our unused resources, wastes and by-products with a view to their utilization in new or subsidiary processes of manufacturing; to develop ways and means by which the present small force of competent and trained research men can be augmented.

This work is being rapidly organized and the following organizations have volunteered to help in it: The Canadian Society of Civil Engineers, Canadian Mining Institute, Canadian Manufacturers' Association, Society of Chemical Industry and the Canadian Society of Forest Engineers. The country will be divided up into districts and volunteer field-workers will cover these districts and gather all available information.

There is a considerable shortage of labor this spring, many of the companies having difficulty in getting sufficient men for their drives. The spring has been late and dry and there is therefore not as much water as is needed for driving operations.

The Quebec Government is taking an interest in the reforestation of its burnt-over lands and is considering arrangements by which the limit holders will undertake this work.

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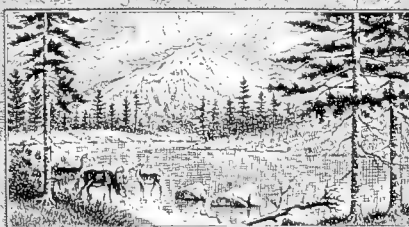
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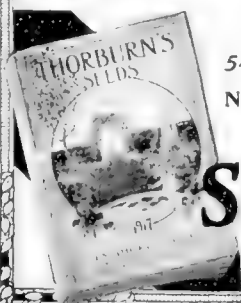
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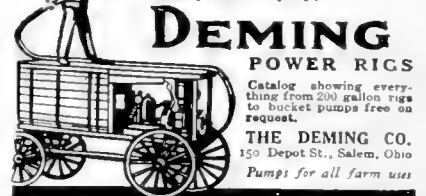
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Skogsvardsföreningens tidskrift, March 1917. Skall staten driva sagverksrörelse (Shall the state carry on a sawmill business?), by Otto Hellström, p. 269-73; Om samarbete mellan skogsvardsnämnderna i Nor- och Västerbottens län och de år 1916 tillsatta skogssingenjörerna inom samma läns kustland (Concerning cooperation between the forest protective boards in the Norrbotten and Västerbotten district and the forest engineers added in 1916 in the whole district's coast), by Vilh. Alund, p. 273-6; Bidrag till frågan om skogsbrukets organisation (Contribution to the problem of the organization of forestry), by R. Wikander, p. 276-7.

Tree talk, March-May, 1917.—Insect enemies of trees, p. 72-4; White pine blister rust, by W. H. Rankin, p. 77-8; Modern tree surgery, p. 80-3.

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The Forest Service is now examining and will offer for sale as a pulpwood proposition the merchantable live and dead timber marked or designated for cutting on an area located in approximately Township 30 N., Ranges 8 and 9 E., W. M., on the watershed of the Stillaguamish River, Snoqualmie National Forest, Washington, estimated to be 750,000,000 feet B.M., more or less, of western hemlock, silver fir, mountain hemlock, Sitka spruce, Douglas fir, and western red cedar timber, approximately 70 per cent western hemlock, silver fir, mountain hemlock and Sitka spruce suitable for pulpwood. Formal advertisement of this timber will begin and sample contract will be prepared not later than September 1, 1917. Those interested may obtain further information from the

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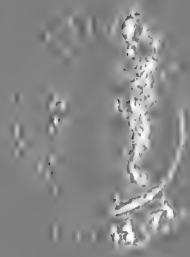
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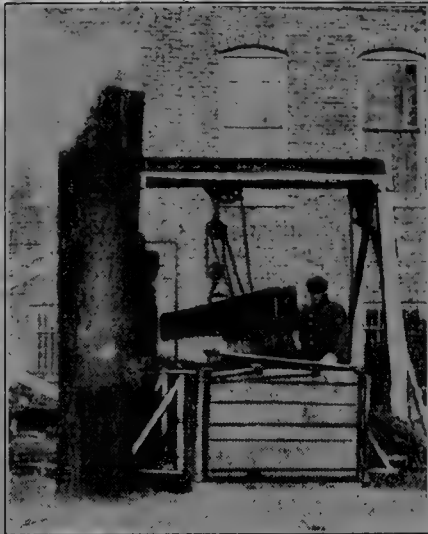
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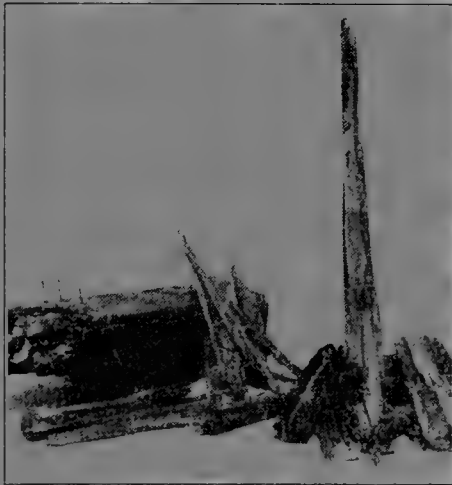
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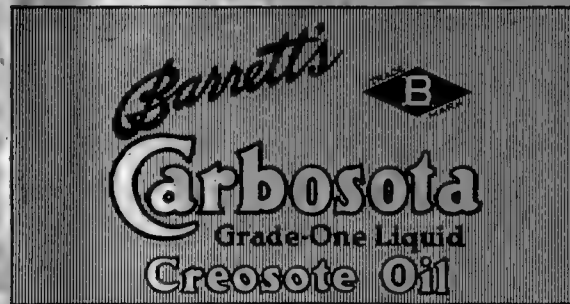
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THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

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JULY 1917 VOL. 23

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SALE OF TIMBER FLATHEAD INDIAN RESERVATION

SEALED BIDS, MARKED OUTSIDE "BID. Flathead Timber, Ronan Unit" and addressed to Superintendent of the Flathead Indian School, Dixon, Montana, will be received until twelve o'clock noon, Mountain time, Tuesday, September 11, 1917, for the purchase of the merchantable timber upon tribal and allotted lands situated within Sections 4 and 5 T. 19 N., R. 19 W.; Sections 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 32, 33, and 34 T. 20 N., R. 19 W.; Section 21, 22, 27, 32, 33, and 34 T. 21 N., R. 19 W.; Section 1 and Section 12 T. 20 N., R. 20 W. M. P. M. containing approximately 57,000,000 feet of timber, over 80 per cent Western Yellow Pine. Each bid shall state the amount per thousand feet B. M. offered for Yellow Pine (including "bull pine") and the amount per thousand feet offered for Fir, Larch and other species. Each bid must be submitted in triplicate and be accompanied by a certified check on a solvent national bank, drawn in favor of the Superintendent of the Flathead Indian School, in the amount of \$2,500. The deposit will be returned if the bid is rejected, and retained as a forfeit if the bid is accepted and the bond and agreements required by the regulations are not furnished within 60 days from the date when the bid is accepted. No bid of less than \$3 per thousand feet for Yellow Pine and \$1.25 per thousand feet for Douglas Fir, Larch and other species will be accepted. The right to reject any and all bids is reserved. Copies of regulations and other information regarding the proposed sale including specific description of the sale area may be obtained from the Superintendent of the Flathead Indian School, Dixon, Montana, Washington, D. C., May 4, 1917. CATO SELLS, Commissioner of Indian Affairs.

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AMERICAN FORESTRY

VOL. XXIII

JULY 1917

NO. 283

CAN AND CANNON; DRIER AND DREADNAUGHT

BY NORMAN C. McLOUD

INSPIRED by the success of the Home Gardening campaign the Conservation Department of the American Forestry Association is now coöperating with the National Emergency Food Garden Commission in giving attention to the proper handling of the national abundance produced by 2,000,000 or more food gardens. In this work lies Conservation in its highest form. Production is but the first step in the fight against possible war-time scarcity of food. The next step is to insure the wisest and best use of nature's abundance. Waste must be eliminated. Every pound of foodstuffs must be utilized for food. In no other way can the nation reap full reward for the labors of its Home and Community Gardeners. To do this calls for Home and Community Canning and Drying on a national scale. To bring this about is the present aim. In this movement there is need for help from the individual membership of the American Forestry Association. By spreading the gospel of Food Thrift, by encouraging the people of their communities to can or dry all vegetables and fruits that can be canned or dried, and by helping to give the widest possible circulation to the Canning and Drying Manuals issued by the Commission the members of the Association will be making constructive contribution to the cause of Food Conservation.

FOOD Conservation by Canning and Drying in the homes of America is the object of a nation-wide campaign now being conducted by the National Emergency Food Garden Commission of Washington, D. C. In coöperation with the Conservation Department of the American Forestry Association the Commission has been instrumental in causing the most remarkable Home Gardening movement the world has ever known. Comprehensive survey of the country has enabled the Commission to announce that more than two million food gardens have been planted and cultivated this year. Most of these were on ground on which no planting had been done in the past. The estimated value of the crop is over \$250,000,000. The present aim is to insure the wisest and most effective use of the vast surplus of garden stuff created on this newly discovered planting area.

Even a small garden plot will produce more vegetables than the average household can consume during the growing season. This is Nature's way of providing for the future. It is no part of Nature's scheme of things that the surplus should go to waste. The obvious intent of summer's over-abundance is that it should be converted

into an unfailing source of supply for the needs of the winter. To do this calls for an army of Home Canners and Home Driers. These are as important as the army of Home Gardeners. In some respects they are even more important. For this reason an urgent summons has gone forth drafting the Soldiers of the Soil to the battle against waste. The can is as much needed as the cannon; the drier is as important as the dreadnaught or the submarine.

The battle cry of the home gardening movement was for food "F. O. B. the Kitchen Door." The new call is for food "F. O. B. the Pantry Shelf." Unless garden products are saved for winter use much of the labor of the Home Gardeners will have been for naught. They will have had the benefit of summer enjoyment of their

food products, but they will miss the greater benefit that comes from providing for the winter. With appetites adjusted to the unprecedented abundance of this year's growing season, American families can ill afford to go into the winter months without provision for a liberal supply of the vegetable products that have contributed so much to their summer enjoyment and physical health. Pal-



CARROTS FOR THE WINTER

When sliced lengthwise and properly dried, carrots appear as here pictured. Their appetizing appearance is enough to convert any household to the movement for food conservation by Drying and Canning in the home.

ates trained to home-grown vegetables, and pocket-books trained to the money saving made possible by Home Gardening, will find the sting of winter sharpened if they fail to save everything that can be saved. To effect this saving means that we must Can all food that can be Canned or Dry all food that can be Dried.

As a result of modern methods, vegetables and fruits canned at home closely resemble the products in their natural state. With most of them no cooking is required in preparing them for winter storage. The single period, cold-pack method, as developed by latter-day science, reduces home canning to its simplest terms. The name of the method indicates its simplicity. The vege-

kitchen oven or just above the top of the stove. In this way even so small a quantity as a handful of peas, a few sweet potatoes, or even a single turnip may be prepared for the winter. This affords an effective means of food thrift in that it makes possible the saving of left-overs. If small quantities are thus treated from day to day the household will be surprised at the ease with which a considerable quantity may be accumulated.

Drying operations on an even larger scale may be conducted with outfits made at home. A tray, consisting of strips of wood with galvanized wire bottom, may be used over the stove or in the sun. In a still simpler form this tray may be made of a piece of galvanized wire



CANNING ENTHUSIASM KNOWS NO AGE LIMITS

This is a picture taken at a canning demonstration in a school house. The demonstration was conducted by official leaders in cooperation with the school authorities. By no means all the enthusiasts here pictured are school children. In the group may be seen many of an older generation. All of those in the audience are eagerly seeking expert counsel and direction as to home canning.

tables or fruits are packed cold and uncooked. Vegetables are covered with boiling salted water and fruits with hot sugar syrup. The jars are then sterilized in boiling water or steam, to kill bacteria and prevent spoiling, and the finished product is ready for sealing and storage. The simplicity of the process commends it to every household.

Drying is even simpler than canning. It may be accomplished with little or no expense for outfits or containers. The simplest form is sun drying. On hot, dry days sliced vegetables and fruits are exposed to the sun, on sheets of unprinted paper or lengths of muslin. This will give a perfect product, if care is taken to prevent exposure to insects and to rain or dew. Insects can be kept away by a covering of cheesecloth. Another simple form of drying is to place vegetables or fruits in the

netting with the edges turned up for an inch or two on sides and ends. More complete driers for cookstove use may be made at home with slight outlay, or they may be bought for as little as \$3.50. Driers of larger size and more conveniences may be had at prices ranging from \$16.00 to several hundred dollars.

In canning and drying the work may be done in the individual home or by groups of families. By forming a club and carrying on the work at a schoolhouse or other central place any number of households may purchase the most improved equipment at slight individual cost and have the advantage that arises from the use of the best facilities as well as having the benefit of neighborly rivalry. Community canning and drying are especially recommended as producing the best possible results.

The imperative need for Food Thrift was recognized

by the National Emergency Food Garden Commission months ago. Anticipating the vast production that would result from its campaign for the planting of Home Gardens, the Commission began its propaganda for canning and drying before the first garden crops were harvested. The campaign has been conducted with the same nation-wide organization that made the gardening campaign so successful. It is now in full swing and will be continued throughout the season with a persistence and thoroughness that will cause it to reach practically every household in the United States.

As a part of the campaign of Home Education in saving food products for winter use, the Commission has issued two booklets for general distribution. One of these is the Home Canning Manual, giving detailed instructions for the conservation of vegetables and fruits by the single period, cold-pack process. In this pamphlet are embodied the results of research work by recognized experts, and every effort has been made to have the manual a complete guide to canning operations in the home and in community clubs. The companion booklet is the Home Drying Manual, intended to serve the same purpose in connection with the drying process. In this pamphlet explicit directions are given for the preservation of a large variety of vegetables and fruits by sun drying, by the use of artificial heat, and by the use of the electric fan. Directions for pickling and for storage are also included.

These manuals are similar to the Home Gardening Primer issued by the Commission during the planting season, several hundred thousand copies of which have been distributed throughout the United States. Copies of the Home Canning Manual and the Home Drying Manual may be had upon request from the offices of the National Emergency Food Garden Commission at 210-220 Maryland Building, Washington, D. C. Two cents for postage should be enclosed with each request for one of these booklets. There is no charge for the manuals themselves.

The publication of these manuals is only a part of the campaign of education. As was the case in the

gardening campaign, the Commission is conducting a national school in coöperation with newspapers all over the country. Daily lessons in canning and drying are furnished these newspapers and are being printed in nearly two thousand publications.

As a result of this splendidly organized educational work, no household will have an excuse for failure to do its share in the conservation of the nation's food supply. All information needed to make expert canners and driers of the people of America is available through the medium of the manuals and the daily lessons published in the newspapers. The intention of the Commission is that no household shall be overlooked.

Everybody is

needed in the army of canners and driers. Every request for a booklet will be cordially welcomed and every possible encouragement afforded those who are ready to do their share in the great fight against the waste of food.

From every part of the country and through countless channels comes proof that America is already deeply stirred over the food question. Prices for everything that enters into the daily diet of a hundred million people are abnormally high. With this condition prevailing during the season of production, it is evident that the winter months will bring widespread hardship unless due heed is given the imperative demand for thrift in the use and saving of Food.

The battle cry of Food Thrift is directed to every household in America. Its urgency should be impressed on every good citizen, regardless of age, sex, or condition. Those who have done canning and drying in the past should this year engage in these activities on a larger scale than ever before. For those who have not done these things in the past, wartime is the time to begin. Never again will the American Home have the same opportunity to serve the American Nation.

To become a canner or drier of vegetables and fruits it is not necessary that one should be a home gardener. For those who have their own gardens, of course, the



COMFORT AND UTILITY

By the use of the electric fan it is possible to achieve excellent results in drying vegetables and fruits. The picture shows trays stacked in front of the fan, with the air current directed lengthwise in relation to the trays. The method is extremely simple.

matter of summer preparation for winter food supply is already partly solved. With an abundant supply of green stuffs of their own raising, they are independent from the very outset. To non-producers, however, the call for canning and drying is in no measure less urgent. Even though they must buy their vegetables and fruits for canning, they will find that the money saving will be very large, for the reason that the buying

will be done during the season of lowest prices. Any housewife can convince herself with five minutes of figuring that she can reduce the cost of winter living by availing herself of summer buying. If she waits until the growing season is over and buys cold-storage vegetables or canned goods, she will find her household expenses greatly increased over the cost of the same vegetables bought during the summer and prepared in her own home.



POTATOES THAT APPEAL

Note these potato strings and imagine how you would like them. Peel away for immediate use at any time during the winter. They have been peeled, passed through a grinder and then dried. By elimination of the moisture they are reduced to size that takes little storage room.

own means of furnishing competition. The one way in which this can be done is by canning and drying while the supply is plentiful. To do this is helpful in two directions. It utilizes the vast surplus that would otherwise go to waste, and it makes the household independent of the high prices of the winter season.

Another factor making for higher prices during the winter is that divers intermediate charges and profits are added to the price before they reach the consumer. The cost includes the charges for cold storage, for warehousing, for transportation, for distribution, and for many other phases of commercial necessity, to say nothing of the interest and dividends which must be earned on the invested capital of every agency concerned in preparation, distributing and selling. With vegetables and fruits canned at home even the non-producers are freed from the tax properly placed on winter purchases. They pay for no handling except that connected with the market operations of the fresh supply. From the various charges and profits connected with goods bought during the winter they are entirely immune. In this they are on even terms with the home gardeners after the first cost of the green stuffs.

Of similar importance is the national need for reducing the strain on the transportation facilities of the country. With the vast shipments of munitions and countless other forms of war merchandise

now taking place, the railroads are already strained beyond their powers. With the approach of winter this strain will be tremendously increased. Authorities agree that next winter will see freight congestion throughout America on a more appalling scale than has ever been experienced. The importance of this in its relation to food supply can not be overemphasized. If the homes of America permit themselves to face the winter with their usual dependence on the corner grocery and the storage warehouse for their foodstuffs they will be inviting tragedy in the form of high prices and



AT HOME WITH A ROTARY SLICER

The housewife in this picture is preparing sweet potatoes for the drier, with the aid of a rotary slicer. She has already cut the potatoes into slices and is now cutting these slices into strips, with the same machine.

Various causes contribute to this increased cost. Not the least of these is that the winter supply of storage goods and canned products lacks competition with the fresh products. With all merchandise the markets are ruled by the laws of supply and demand. In the growing season the supply is so great as to keep prices at the lowest level. During the winter, when production is stopped, the canned goods and the storage goods have the market to themselves. That prices should then be much higher is one of the plainest truths of economics. For this reason the individual household must provide its



AN ARGUMENT IN FAVOR OF DRYING

Nothing could be more inviting than this plate of foodstuffs prepared for drying. This shows the results to be achieved, as to uniformity and appearance, by using a mechanical device for preparing shreds or strips of vegetables.

shortage. If they engage in a drying and canning campaign of preparedness they will be inviting independence, and at the same time they will be relieving the traffic situation. If twenty million families, or even ten million, are able to draw on their own storerooms for canned goods and dried products the relief to the traffic situation will be tremendous. So vital is the need for this relief that even if there were no question of preventing waste the urgent need for canning and drying would be enough to justify the stress now being placed upon them. With the double reason the requirement is such as to be the patriotic duty of every household. No family can afford to ignore this duty. No family can afford to be a food-slacker in this time of war.

Recognizing the tremendous need for canning and drying, the National Emergency Food Garden Commission, in its manuals on Home Canning and Home Drying, has laid great emphasis on the importance of these activities. This advice is fundamentally sound and is based on the knowledge and counsel of the nation's leading students of food conservation and the serious problems involved in the present situation. In its treatment of the subject the Commission has undertaken to drive home to every household and every good citizen the duty of the individual in connection with the food supply of the nation and its European allies. So tersely expressed are these arguments, and so irrefutable, that they are reproduced herewith.

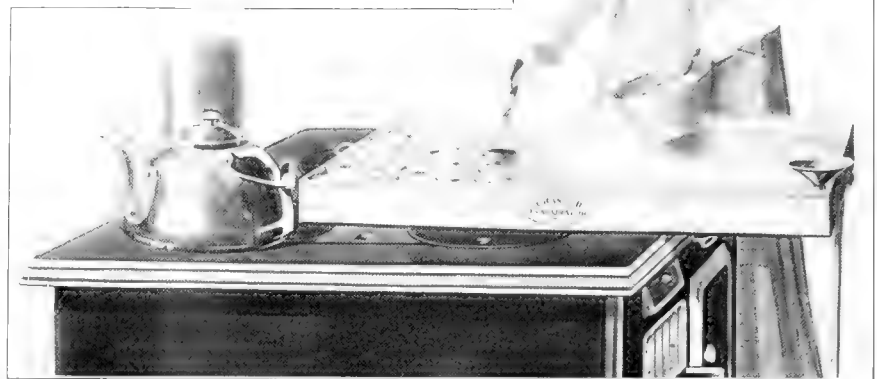
"To save vegetables and fruits by Canning this year is a patriotic duty," says the Commission in its Manual on Canning. "The war makes the need for Food Conservation more imperative than at any time in history. America

is responsible for the food supply of her European Allies. The American family can do nothing more helpful in this emergency than to Can All Food that Can be Canned. In this way the Abundance of the Summer may be made to supply the Needs of the Winter.

"To do this means the practical application of the principles of Food Thrift. It means the elimination of Waste. The situation demands that every American should do his share toward increasing the Food Supply of the World. It is time to begin starving the American Garbage Pail. It is time for every woman to enlist in the Army of Cannerns. It is time for the conservation of food."

In its introduction to the Manual on Drying, the Commission says:

"Drying vegetables and fruits for winter



EVAPORATOR FOR USE ON COOKSTOVE

The fair Conservationist in this picture is placing a tempting array of apple rings on an evaporator which she bought for \$6.00. This drying outfit rests on the kitchen stove and is supported at one end by a metal leg reaching the floor.

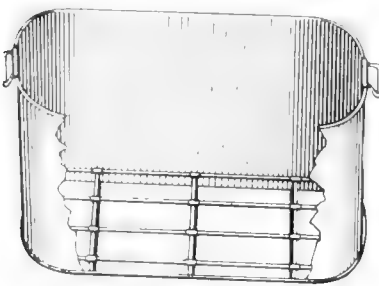
use is one of the vital national needs of wartime. As a national need it becomes a patriotic duty. As a patriotic duty it should be done in every family.

"Failure to prepare vegetables and fruits for winter use by drying is one of the worst examples of American extravagance. During the summer nature provides an over-abundance. This year, with the planting of 2,000,000 home food gardens, stimulated by the National Emergency Food Garden Commission, this abundance will be especially large. The excess supply is not meant to go to waste. The over-abundance of the summer should be made the normal supply of the winter. The individual family

THE BATTLE AGAINST WASTE

WAR-TIME Food Gardens have already given us an abundance of vegetables "F. O. B. the Kitchen Door." None of these must be wasted. Every household must enlist in the useful army of Food Cannerns and Food Driers. The Can is as much needed as the Cannon; the Drier is as important as the Dreadnaught or the Submarine. Their importance must not be overlooked. If we use them as we should our immediate food abundance "F. O. B. the Kitchen Door" will be transformed into a winter food supply "F. O. B. the Pantry Shelf."—CHARLES LATHROP PACK.

should conduct drying on a liberal scale. In no other way can there be assurance that America's food supply will meet our own needs. In no other way, surely, can we answer the enormous demands made upon us for furnishing food for our European Allies.

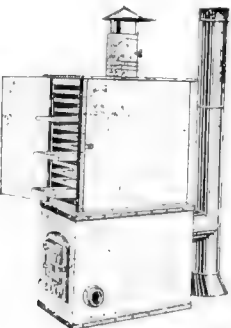


WHAT EVERY HOME HAS

This is an everyday family wash-boiler. By inserting a rack of light wooden strips, an inch from the bottom, its owner has made it into a perfect hot-water bath for home canning by the cold-pack method. The jars are subjected to heat in this boiler and the contents require no cooking.

the growing season, when they are plentiful, and high prices during the winter when production is stopped. Winter buying of vegetables and fruits is costly. It means that you pay transportation, cold-storage and commission merchants' charges and profits. Summer is the time of lowest prices. Summer, therefore, is the time to buy for winter use.

"Every pound of food products grown this year will be needed to combat Food Famine. The loss that can be prevented, the money saving that can be effected and the transportation relief that can be brought about make it essential that every American household should make vegetable and fruit drying a part of its program of Food Thrift. The results can be gained in no other way. Vegetable and fruit drying has been little practiced for a generation or more. Its revival on a general scale is the purpose of this manual. There is no desire to detract from the importance of canning operations. Drying must not be regarded as taking the place of the preservation of vegetables and fruits in tins and glass jars. It must be viewed as an important adjunct thereto. Drying is important and economical in every home, whether on the farm, in the village, in the town, or in the city. For city dwellers it has the special advantage that little storage space is required for the dried food. One hundred pounds of some fresh vegetables will reduce to 10 pounds in drying without loss of flavor or food value.



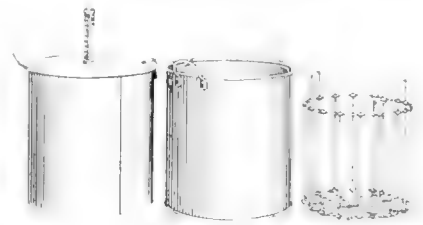
FOR HOME DRYING

This is a type of drier manufactured for home use. It may be bought either with or without its furnace, and used on top of the ordinary kitchen stove.

"This year's need for vegetable and fruit drying is given added emphasis by the shortage of tin for the manufacture of cans. This condition has created an unusual demand for glass jars. For this year, therefore, drying is of more than normal importance.

Dried products can be stored in receptacles that could not be used for canning."

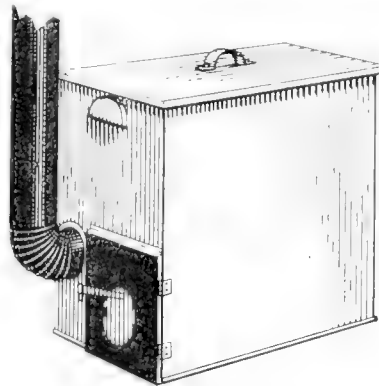
The storage of vegetables in their natural condition is treated by the Commission as an important adjunct to canning and drying. Potatoes, beets, carrots, parsnips, salsify, turnips, cabbage, celery, onions, sweet potatoes, dry beans, and dry lima beans may be so stored.



CANNING MADE EASY

A simple type of canner for use in the cold-pack method. This is known as a water-seal outfit and consists of cover, with thermometer, a holder for jars or cans and a basket-crate for ease in handling the containers. It is used on the top of a kitchen stove.

In a house heated by a cellar furnace, partition off a small room. It is best to have in it at least one outside window for temperature regulation. An earth floor is desirable. In this room may be stored potatoes, beets, carrots, parsnips, turnips, and salsify. Put them in bins or in boxes, baskets or barrels. The vegetables should be harvested when the ground is dry and should lie out-doors until any moisture on them has evaporated. Remove the tops from beets, turnips, carrots, and salsify.



A CANNER FROM THE STORE

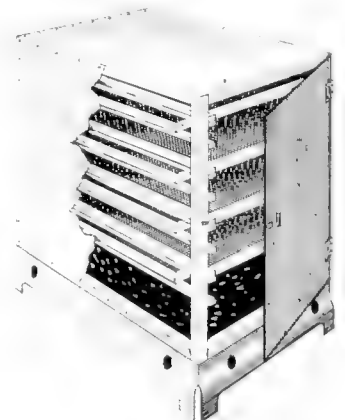
The canner here pictured is for use in the cold-pack method of canning. It has its own furnace, a vat for holding jars, a smoke pipe and a cover. There are several makes of this type of canner and they are efficient and not expensive.

For out-door storage make a pit 6 or 8 inches deep and as large as needed, in a well-drained place. Line this with straw, leaves, or similar material, and place the vegetables on this lining in a conical pile. Cover the vegetables with straw, leaves or something similar and cover this with enough earth to prevent freezing. It is well to make several small pits rather than one large one, for the reason that when a pit has been once opened the entire contents should

be removed. This form of storage is used for potatoes, beets, carrots, turnips, parsnips, cabbage, and salsify. It is well to store several varieties of vegetable in one pit, for convenience in winter use.

For cabbage the pit should be long and narrow. The cabbages are placed in rows with heads down and covered with dirt. The removal of a portion of this supply does not disturb the remainder. Cabbages may be stored in the cellar in boxes or barrels of earth or sand.

Briefly summarized, America is now in the midst of its year of greatest plenty in the production of garden truck. Emergency food gardens have changed the entire



USEFUL COOKSTOVE DRIER

The type here pictured is made at home or may be bought already made. It has galvanized iron sides, a series of trays and a swinging door. It is used on top of the kitchen stove and is highly efficient in drying vegetables and fruits.

face of the national landscape. Complete transformation has been wrought in the American backyard and vacant lot. In the past these areas were waste places whereon the chief fruitfulness was dilapidated tinware. Discarded tins from the corner grocery were a standard crop, perennial, unfailing, and in perpetual bloom. To-day the waste places flourish with the abundance of nature. Instead of tomato cans the backyard

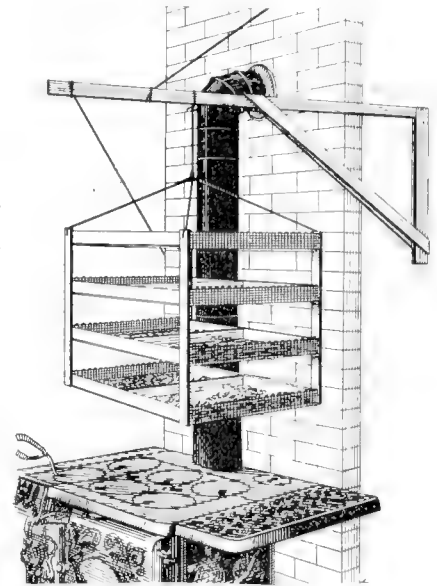
HOMEMADE SUN DRIER

A simple form of construction is used in this drier and the ease with which it may be made is out of all proportion to its great value. The sloping glass top exposes the contents to the sun. The tray for holding vegetables or fruits is made of strips of wood with galvanized wire mesh bottom.

has its crop of tomatoes. For unnumbered tins we have substituted foodstuffs in unmeasured tons. With the advent of the season for canning and drying we must carry the transformation one step further. For the discarded tins we must now substitute cans and jars filled with an abundance of our own making. Now that we have taken the cans from the backyards we

must place their brethren on the pantry shelf as component parts of a company of holders carrying our food supply for the winter. The food garden has already given us food "F. O. B. the Kitchen Door." Our canning and drying operations must give us winter abundance "F. O. B. the Pantry Shelf."

In this campaign F. O. B. has a double meaning. To the student of economics it means delivered free of charge. To those who realize the need for an abundant food supply for the allied armies its meaning is "Feed Our Boys." That this meaning will be met with indifference and neglect is not to be believed.



ONE FORM OF DRIER MADE AT HOME

This drier makes possible highly effective vegetable and fruit drying and its simplicity is such that it may be made at home with little trouble. It consists of a series of trays supported by light framework. The bottoms of the trays are of galvanized wire mesh. It is to be used over a stove.

A WATCHFULLY WAITING RODENT

By Lewis Edwin Theiss

WE were trout fishing. Noon came and with it the call of Nature. We looked about for a suitable place to eat. Near the stream was an opening in the forest. A giant tree had fallen, making a great hole in the leafy canopy. Through this hole in the forest roof, the sun streamed down warm and grateful, for it was a chilly day in early spring. The tree lay prone in the center of the patch of sunlight. We put our lunch on its trunk and seated ourselves astride the tree, facing each other, the lunch between us.

Twenty-five feet distant rose a tuft of tall grass, near some underbrush. The grass was a vivid, fresh green. All about it were the sere, brown leaves. This splash of bright color caught and held the eye. And as we looked at it, one of the graceful stalks of grass trembled, waved fitfully, and disappeared. The remainder of the grass stalks were as motionless as the painted ship of poetic fame. We watched. Presently a second stalk quivered, shook, and fell. In due season another vanished. Yet not another thing stirred.

Intently we watched. One after one the grass stalks disappeared; and when the clump was sufficiently thinned, we saw the cause of it all. A sleek, little woodmouse

was cutting these grass blades one by one and dragging them into her nest to line it.

The entrance to the nest was the familiar little opening under the brown leaves. So unsubstantial was this leaf roof that we could even trace the mouse's movements underground, by the slight motion of the leaf-mold.

For perhaps fifteen minutes we watched this little creature in silence. Blade after blade of grass disappeared. Then no more fell for a time. Then the harvesting was resumed, only to be interrupted again. What was the mouse doing in these hiatuses? We watched intently.

Suddenly, near at hand, two button-bright eyes and a brown nose popped out from under the leaves, regarded us a moment, and disappeared. The grass cutting was resumed. Presently it stopped. We watched closely. Many feet away the same brown head suddenly appeared above the forest floor. It watched us for a moment, then withdrew. And again the haying continued. So it went on throughout our entire lunch period—which we purposely prolonged. A dozen tunnels led to the grass-lined nest, and at every one the little mouse took a squint at us, then went on with her work. Presently we withdrew quietly. We had learned how the mouse kept watch of us. We went away wondering how the trout managed it—for our creels were empty.

NEVER backfire against a forest fire from the bottom of a mountain. You may burn up some of your own party if you do. Go to the top and work down the hill.

If you are burning resinous wood, such as pine, and your chimney becomes clogged with soot, throw a few pieces of sheet zinc on the fire.

FOREST REGIMENT OFF FOR FRANCE

THE roster of commissioned officers in the "forest regiment," or, as the War Department designates it, the Tenth Reserve Engineers (Forest), has just been announced and includes two regular army officers, 15 foresters from the U. S. Forest Service and two from the Forest Branch of British Columbia, one lumberman from the Indian Forest Service, and 13 foresters and lumbermen taken from private or institutional work.

The War Department has designated Lieutenant Colonel James A. Woodruff of the Engineer Corps to organize and command the regiment, and Beverly C. Dunn, Captain of Engineers, as Adjutant. W. B. Greeley, now Assistant Forester in charge of the branches of silviculture and research, U. S. Forest Service, and formerly district forester in charge of the National Forests of Montana and Northern Idaho, has been selected to serve as Major on the regimental staff and to aid in the organization and equipment of the regiment. The remaining officers will be as follows:

Majors in command of battalions: R. E. Benedict, assistant forester in the Forest Branch of British Columbia, and C. S. Chapman, manager of the private timber protective associations of Western Oregon.

Captains: Edward S. Bryant, forest inspector, U. S. Forest Service, stationed at Washington, D. C.; Inman F. Eldredge, forest supervisor of the Florida National Forest, stationed at Pensacola, Florida; J. D. Guthrie, forest supervisor of the Coconino National Forest, stationed at Flagstaff, Arizona; Evan W. Kelly, forest examiner, U. S. Forest Service, stationed at San Francisco; John Lafon, assistant forester in charge of timber operations, Forest Branch of British Columbia; David T. Mason, professor of forestry at the University of California; W. N. Millar, professor of forestry at the University of Toronto; Barrington Moore, a private forester from New York City; Arthur C. Ringland, forest inspector, U. S. Forest Service, stationed at Washington, D. C.; Dorr Skeels, logging engineer and professor of forestry at the University of Montana. The three captains taken from university professorships are, it is stated, chosen because of their extensive past experience in practical lumbering and other woods work.

First Lieutenants: Risdan T. Allen of the Allen-Medley Lumber Company, Devereux, Georgia; M. S. Benedict, forest supervisor of the Sawtooth National Forest, stationed at Hailey, Idaho; Robert L. Deering, forest examiner, U. S. Forest Service, stationed at Albuquerque, N. M.; Clarence R. Dunston, lumberman, U. S. Indian Service, stationed at Dixon, Montana; D. P. Godwin, forest examiner, U. S. Forest Service, stationed at San Francisco; J. G. Kelly, lumberman, of Portland, Oregon; Eugene L. Lindsay, forest examiner, U. S. Forest Service, stationed at Washington, D. C.; E. C. Sanford, forest supervisor of the Idaho National Forest, stationed at McCale, Idaho; H. C. Williams, who recently resigned from the supervisorship of the same forest; Stanley L. Wolfe, forest examiner, U. S. Forest Service, stationed at Washington, D. C.; J. B. Woods of the Arkansas Land and Lumber Company, Malvern, Arkansas; Herman Work, deputy forest supervisor of the Caribou National Forest, stationed at Montpelier, Idaho.

Second Lieutenants: H. R. Condon, forester with the Pennsylvania Railroad, Philadelphia; S. H. Hodgman, logging camp foreman with the Potlatch Timber Company, Potlatch, Idaho; W. H. Gallaher, forest examiner, U. S. Forest Service, stationed at San Francisco; J. W. Seltzer,

forester with the New Jersey Zinc Company, Franklin, New Jersey; H. B. Shepard, forester with the Lincoln Pulp Company, Bangor, Maine; E. F. Wohlenberg, forest examiner, U. S. Forest Service, stationed at Flagstaff, Arizona.

Recruiting for the rank and file of the regiment is actively under way. The enlisted men will be picked woodsmen. With only two thousand men needed out of the vast number of woods workers which the lumber industry of the United States employs, and with rapid recruiting necessary, a special machinery has been developed to handle the preliminary stages of enlistment. Local representatives of the Forest Service in various parts of the country and a number of State forestry officials have been designated as "listing officers" to secure applications from men in their neighborhood who are known to be of the right type. By this "still hunt" method it is believed that an efficient force can be gathered much more successfully than by encouraging a large number of miscellaneous applications which could not be thoroughly sifted without a great deal of effort. Great care will be used to secure men proficient in woods work.

The regiment will convert available timber behind the battle lines in France into railroad ties, trench timbers, mine props, bridge timbers, lumber, and cordwood needed in the military operations of the British Army. The work may, it is stated, fall within the danger zone and will be done largely in sprout forests of oak, beech, hornbeam, and other hardwoods, with some stands of pine. The timber is small in comparison with most American forests, much of it from 8 to 12 inches in diameter. These forests resemble the woodlots of southern New England, and the operations will be similar to portable sawmill logging and tie cutting in Massachusetts, Connecticut, Maryland, and Virginia. The larger logs will be sawn into boards and dimension material, while the smaller trees will be cut into hewn ties, poles, props, etc. The closest possible use of timber will be required.

The French forests have for many years been managed with great care and skill. It is the view of the Government's forestry officials that if the American forest regiment is to do creditable work, it must be able not only to cut and manufacture the timber with high efficiency, but also to avoid waste and leave the forests in good shape for future production. This is the reason for selecting mainly trained foresters as officers.

The regiment will be made up of six companies of 164 men each, aside from battalion and regimental staffs, drivers, and commissioned officers. It will be sent overseas as soon as organized, trained and equipped. It will first be assembled at two training camps, the regimental headquarters, and one battalion at the American University, Washington, D. C., and one battalion at Fort Leavenworth, Kansas.

Enlistment is for the period of the war. Recruits must be between the ages of 18 and 40 and must be citizens of the United States or have declared their intention to become such. They are subject to the same physical examination as that required for other military service.

While designed to serve primarily as a mobile logging and milling crew, the regiment will be organized on military lines and its members will be uniformed and armed like other units in the United States Army. The first duty of its officers and men will be to learn military discipline and teamwork through thorough-going drill at training camps.

For the logging crews skilled axemen, sawyers, tie hewers, skidders, teamsters, and blacksmiths are being enlisted. Millwrights, sawyers, and engineers are to man portable sawmills which will form part of the equipment, while suitable helpers for the various activities connected

with woods operations and the maintenance of large camps will be picked up.

The prompt recruiting of this regiment will, it is expected, enable it to be among the first to carry the flag of the United States abroad.

FORESTER GRAVES IN FRANCE

ANNOUNCEMENT of the arrival of Henry S. Graves, Chief of the U. S. Forest Service in Paris, has led the Department of Agriculture to explain that Mr. Graves has gone abroad to make arrangements for the forest work which the American army engineers will undertake in France in connection with the military operations of the Allied forces.

Because of the opportunity for service by this country in woods work incidental to the war which the request of the British Government for the sending of a forest regiment was believed to present, Mr. Graves has been granted leave of absence from his position as head of the Forest Service and has received a commission as Major in the Reserve Engineer Corps. He has not been assigned to any command, but is acting under instruc-

tions, it is stated, to proceed to France in order to learn on the ground in advance just what conditions will need to be met, what equipment will be called for, and how extensively the services of American lumbermen can be utilized to advantage. Meanwhile the recruiting of the regiment which has already been asked for is being pushed by the Forest Service and is said to be advancing rapidly.

One of the staff officers of the regiment, Captain Barrington Moore, is with Mr. Graves for the purpose of arranging for its prompt assumption of the specific duties to which it will be assigned when it is landed in France. While organized on military lines, the work of the regiment will be industrial, not combatant. It will operate in the woods behind the armies, getting out timbers, ties, and lumber required for military purposes.

LUMBER FOR WAR-TIME USES

THE lumber committee of the advisory commission, Council of National Defense, estimates that 2,000,000,000 feet of lumber may be used for purposes directly connected with the war in the next twelve months.

The committee now is given to understand that provision will be made at each camp for anywhere up to 40,000 men, instead of the 25,000 originally planned. This may be due to the decision to call for 125,000 men to serve as a reserve for the first 500,000 men drafted for the new national army.

Second in quantity of lumber required comes the wooden shipbuilding program, which the committee estimates will require about 400,000,000 feet of lumber.

In a statement the committee says:

"The best estimate that can be made of the total amount of lumber required for purposes of national defense within the next twelve months is 2,000,000,000 feet. This sounds like a colossal figure, and it is a big figure, but should give no apprehension that it will disturb the markets or cause a shortage of lumber. Actually this will not exceed 5 per cent of one year's lumber production of this country."

Here are some more lumber requirements seen by the committee: Structures for training camp purposes for the navy, 200,000,000 feet; aviation school cantonments, 120,000,000 feet; erection of 200 buildings at army and navy training camps by the war work council of the

Young Men's Christian Association, 6,400,000 feet; packing boxes and crates for the army and navy, at least 200,000,000 feet; army wagons, 25,000,000 feet; gunstocks, 10,000,000 feet; material for 3,500 aeroplanes, 3,500,000 feet.

Army cots, tent poles, automobiles, artillery, cooperage, furniture, docks and piers, trench lining, saddles, mine timbers, tools, railroad construction, and the lumber necessary in building factories will go to largely swell the total.

The special committee representing the Southern Pine Association here has issued this formal statement:

"The committee representing the Southern Pine Association, acting for the Southern Pine Emergency Bureau, announced to-day that an order for 100 ships to be sawed by the southern mills has been placed by Gen. George W. Goethals, general manager of the United States Shipping Board Emergency Fleet Corporation, at an average price of \$35 a thousand feet at the mills. The Southern Pine Association has asked those mills which can do so to manufacture the timbers required for wooden ships, and a large number of them have bound themselves to furnish complete schedules at the price named for delivery at such shipyards as may be designated by the Government.

"General Goethals has accepted this proposition, to the extent of 100 units (ships), comprising approximately 140,000,000 feet of lumber."

INSTEAD of planting a horse-chestnut, why not plant a real nut tree? Pecans, hickories, or English walnuts cost very little more than horse-chestnuts, make less litter and produce a valuable crop.

MAPLE sugar season is over. It ended when the first leaves unfurled, the sap then becoming less sweet. Seventy drops of sap per minute flow from good trees, and twenty-five gallons of sap make about five pounds of sugar.

LUMBER FOR AN ARMY CANTONMENT

THIS is the story of the use of lumber in an army cantonment, and of the manner in which the American Logging Camp has been copied for regular army uses, in the building of quarters for the Reserve Officers' Training Camps. When the letters R.O.T.C. are seen, this is the interpretation. There are two camps at Fort Sheridan, each of 2500 men, roughly, one camp for Illinois and one for Wisconsin and Michigan combined. Each camp is organized in fifteen companies of about 160 men. Wisconsin and Michigan are in permanent barracks except for four companies which, with the Illinois regiment, are quartered in cantonments on the south side of the reservation. There are quarters for two emergency companies with the four Wisconsin-Michigan companies, making a total of twenty-one companies quartered in the newly-erected wooden cantonments.

The quarters for each company are four buildings, placed end to end with a twenty-foot space between each. On the south is the mess hall, with a kitchen and two tables the length of the building, *à la* lumber camp, bench seats on each side of each table. The next two buildings are the quarters, with cots in each, for eighty men. North of these two is a bathhouse.

The speed of construction of the camp was notable, and a most striking evidence of the ability of the typical American business man to meet emergencies. The contract for the construction of the buildings was awarded to the Sumner Sollitt Company, Chicago, on Saturday evening, April 28. About noon on Sunday, April 29, the Edward Hines Lumber Company, of Chicago, received the order for the material, amounting to a total of some 1,400,000 feet. During the afternoon 5 auto-truck loads of lumber were dispatched to Fort Sheridan to provide quarters for the working force engaged on the job. At 5 o'clock in the evening a train of 50 empty cars was on track in the yards of the lumber company. The entire train was loaded with the 1,400,000 feet on April 30 out of the stock of Northern, Southern and Western lumber carried on hand. The contract called for all dressed lumber. The most remarkable part of the operation, therefore, was that some 400,000 feet of the shipment was run through the planing mills of the lumber company, as well as being loaded on the cars in the same day.

The Chicago and North Western Railroad delivered the trainload of lumber at Fort Sheridan on Tuesday morning, May 1. The Sumner Sollitt Company had its construction force on the ground equipped with gasoline saws and all other devices for quick work. Ohio National Guard Engineers staked out the company streets and buildings. The job was finished on May 10, in just ten working days, using only one shift of men per day. The largest number of men employed on the job at one time was 785. Here is what they built complete, ready for occupancy:

42 barracks, 20 x 126 feet each.

21 mess buildings, 20 x 110 feet each, equipped with tables and benches built in regular logging camp style.

21 lavatory buildings, 16 x 63 feet, equipped with toilets, shower baths, etc.

1 postal exchange building, 20 x 30 feet.

1 telephone exchange building, 20 x 33 feet.

This is the story of one of the camps where officers will be trained for the new army and is duplicated in many other camps throughout the country, as there are fifteen reserve officer training camps in the country, requiring quarters for 35,000 prospective officers. The regular permanent barracks do not begin to provide room for all these men. This story of the Fort Sheridan camp is that of all other camps where cantonments are being built, and will be duplicated on a larger scale to provide quarters for the new army of 500,000 men called out September 1.

OAK TREE FOUNTAIN

By H. E. Zimmerman

FROM the picture one would judge that this drinking fountain at Mount Lowe, California, has its source of

supply in the heart of an oak tree. Some years ago there was a cavity in the heart of the tree. A hole was bored through to the cavity and a water pipe from the mountain stream connected, as shown in the illustration. Later, modern tree doctors filled the cavity, and now the bark has grown over, completely hiding all traces of the operation. Moving-picture companies have used the fountain in films, depicting the quack doctor and his wonderful health restorer, "The elixir of life, or the blood of the oak."



REPORTS compiled by the paving block bureau of the Southern Pine Association show that the wooden block, properly creosoted, is rapidly becoming the vogue all over the country, and popular wherever it has been tried.

The statistics of production by the redwood manufacturers of California show a material increase for 1916, as compared with 1915, but considerably smaller than several recent years.

THE EXTENSION OF NATIONAL FORESTS IN COLORADO

By HERMAN H. CHAPMAN

TEN years ago opposition to the National Forest policy in Colorado reached such proportions that the State demanded and secured from Congress a law which took from the President of the United States the power, given him in 1891, to proclaim new National Forests within the State. Five other States were also included in this measure, namely, Wyoming, Idaho, Oregon, Washington, and Montana.

To-day the people of northern Colorado have petitioned and secured from Congress a law permitting the President to increase these same National Forest areas by the addition of over half a million acres of land. No incident in the entire history of the struggle between nationalism and States rights as applied to our western public lands so emphasizes the growing understanding and approval with which the National Forest adminis-

tration is regarded as this complete reversal of attitude on the part of a State which has been conspicuous in the past for the violence of its opposition and the broad and sweeping character of its attacks on the Forest Service policies. In fact, the insistence of the actual residents of the great agricultural district bordering the foothills of the Medicine Bow Mountains for an extension of the National Forests placed certain Colorado politicians in an embarrassing position, leaving them, so to speak, high and dry, and nullifying much fiery oratory and indignant declamation.

The opposition to National Forests in Colorado centered about the development of the publicly owned water-powers, and these interests are by no means converted to the idea of retention of government ownership and regulation to-day. From this group it spread to the

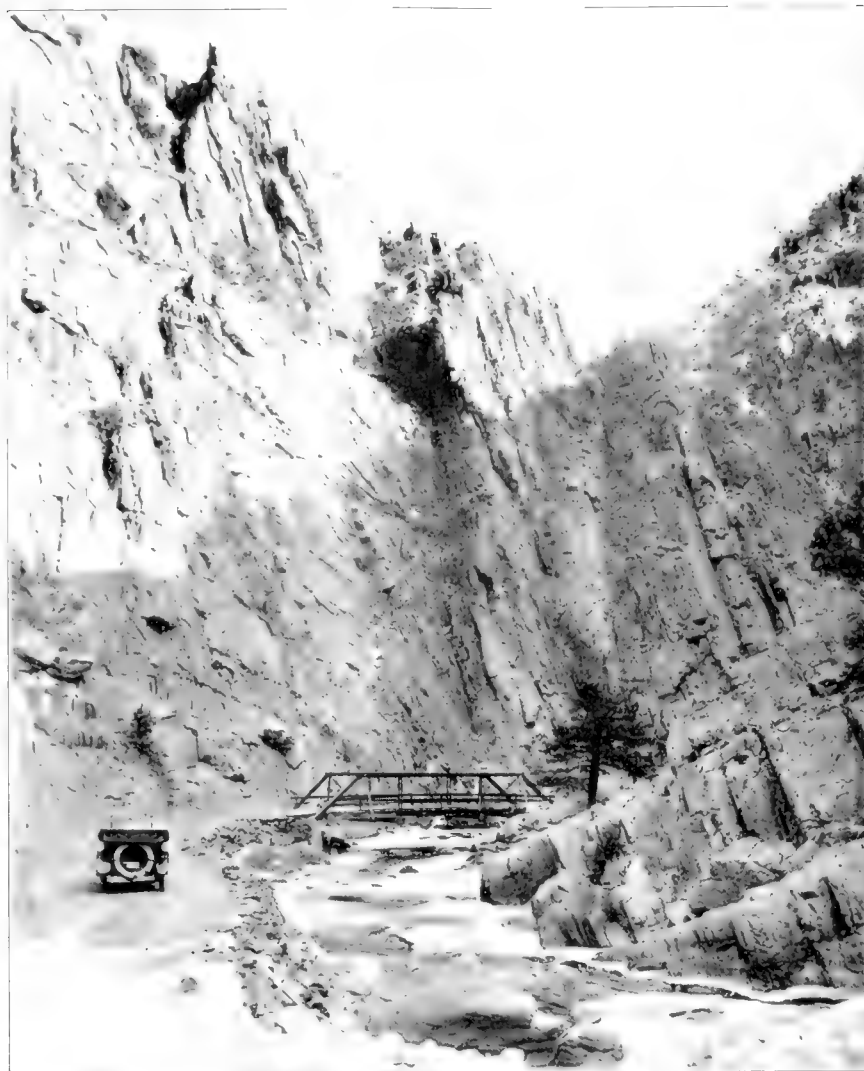


A BEAUTIFUL VIEW OF THE CANYON

Along the Estes Park road—a beautiful stretch typical of the scenery of the section which it is desired to include within the Colorado National Forest.

mining interests, who were persuaded to believe that the National Forests would in some way or other act as a drawback to the development of this industry. Since the location and working of the mines themselves is unobstructed, and has been permitted within the Forests since 1896, the miners were forced to concentrate their opposition on the timber policy of the National Forests. But here again they disagreed as to what constituted the real objections. Under the existing regulations, timber could be purchased from the Forests for the development of mines to any required amount. So one group of objectors claimed that timber lands included within National Forests were at once opened to wholesale and unrestricted exploitation by lumbermen and pole hunters, to the injury of mining and other local industries; while a second group still blindly insisted that the National Forests locked up all resources, including the timber, from any kind of development.

Meanwhile, the agricultural interests, dependent upon watershed



CANYON OF BIG THOMPSON RIVER AND LOVELAND
On the Estes Park auto road—a midwinter scene showing the Canyon and bridge.



GOOD UTILIZATION OF NATIONAL FOREST RESOURCES
These lambs from New Mexico, on the Henry Feit Ranch, are fattening on alfalfa raised locally by the use of irrigation water from the Colorado National Forest, and corn from Nebraska.

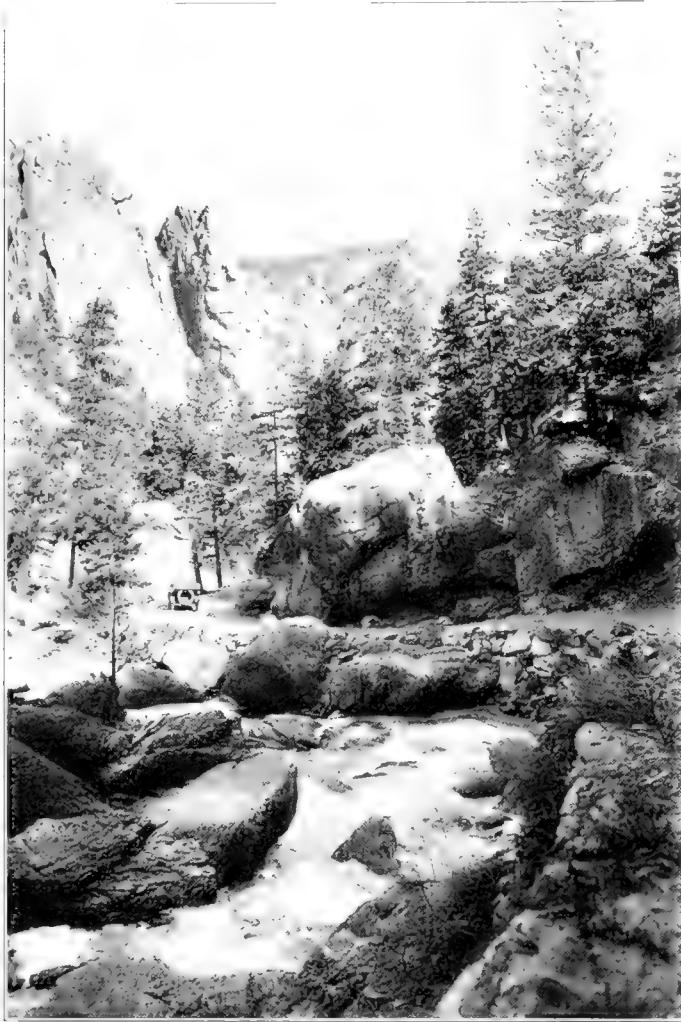
protection for the maintenance of irrigation on many thousands of acres of the richest lands of Colorado, discovered that the ruthless denudation of the foothills of the Medicine Bow range was diminishing the flow of water and causing great damage to irrigation. These foothills had not been included in the original withdrawals for National Forests—because at the time areas containing 15 per cent or more of patented or private land were not considered suitable for National Forest use, and this stretch of territory was honeycombed with mining and timber locations. In the very year 1907, in which the opposition succeeded in prohibiting the creation of any further National Forests by the President, petitions went to Congress from this region asking for this extension of the Forest area. During the last decade this demand has grown constantly stronger and better organized, until it embraced not only the commercial bodies of the foothills towns, the local livestock associations, and the representative agricultural organizations, but included

such bodies as the Boulder County Metal Mining Association, thus bringing the mining interests back into line for a measure formerly bitterly opposed.

And no wonder that pressure was brought to bear for this legislation. The region affected, which consti-

a million acres are irrigated from the streams heading in the Medicine Bow Mountains, and the crops produced are worth over \$10,000,000. Municipal water plants already represent over \$3,000,000 invested, with 20,000 horsepower developed and several additional plants under construction.

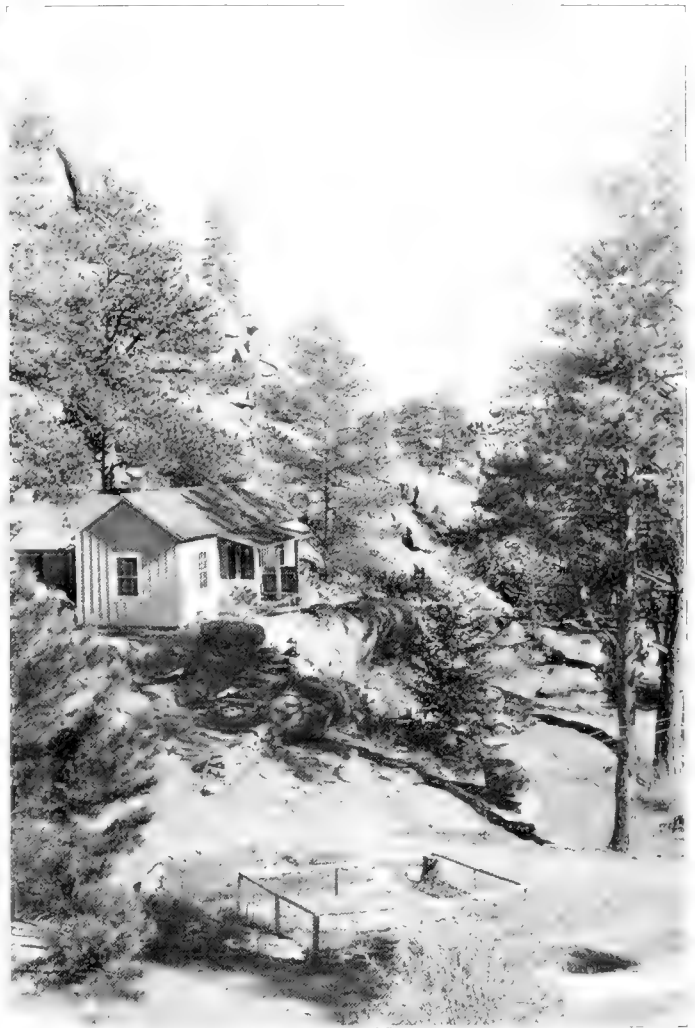
These are the communities whose insistent demand finally overcame the bitter opposition of States rights advocates and champions of unrestrained private exploitation. In 1916 a bill was introduced, which became a law in September of that year, by which the President was



NEAR THE COLORADO NATIONAL FOREST

This is taken on the Estes Park auto road, and shows part of the proposed addition to the Colorado National Forest. The forest and cliffs may be seen in the distance.

tutes the level plains bordering the foothills, is one of the richest orchard and farming communities in the State. Sugar beets, alfalfa, apples, and many grains are produced in abundance, provided only that the land receives water for irrigation. Boulder Creek, Left Hand, the St. Vrain, the Big and Little Thompson, and the Cache La Poudre are all utilized to the last bucketful in fostering the great agricultural wealth of the region. Many thriving towns are located on the plains close to the foothills, among which are Boulder, Ward, Estes Park, Longmont, Berthoud, Loveland, Lyons, Fort Collins, and Greeley, all of which get their domestic water supply from the streams flowing east from the Continental Divide across this foothills region. The sugar factories alone produced in 1916 an output of 319 million pounds of sugar from 86,000 acres of sugar beets, and the by-products, or refuse, from these factories fattened 25,000 cattle and over 1,000,000 sheep. More than half



OLD MAN RANGER STATION

This is one of the most picturesque stations in District 2. It is near Estes Park and on the proposed addition to the Colorado National Forest.

authorized by Congress to proclaim as National Forest land any portion of an area of 524,478 acres adjoining the Colorado and Pike National Forests.

This was promptly followed by the withdrawal of these lands from all forms of private entry, through an order of the Secretary of the Interior. The lands have been since examined and classified, and the addition of this area to the adjoining National Forests now awaits the President's action.

Although on the entire area 252,840 acres are alienated lands belonging or claimed by private parties, or nearly 50 per cent of the total, yet these claims represent an almost negligible area of cultivated or cultivatable

lands. On the Colorado extension but 162 acres are listed by the assessors as agricultural, while but 6402 acres are meadow land. The remainder is assessed as pasture land and valued at \$2 to \$3.50 per acre. Roughly speaking, 25,000 acres of this is owned by the State, 50,000 acres by railroads, 125,000 acres by individuals, and the remainder represents claims pending. So thoroughly have private interests searched this area for possible values that, although a period of over eight months elapsed from the date of introduction of the bill—January 27, 1916—to the date of its passage—October 2, 1916—during which time petitions to secure the withdrawal of the lands from entry were unavailing, yet in that whole period but 14,260 acres of additional claims were filed, leaving a quarter of a million acres of Government land which no one could be tempted to claim.

The sharp contrast between the fertile plains, of which practically every acre capable of irrigation is in cultivation, and the foothills immediately adjoining, covered by this withdrawal, where the only land capable of being cultivated lies in a few narrow ribbons along portions of the larger streams, is an excellent illustration of the natural classification of land into agricultural and non-agricultural areas. Many false statements have been made in the past about the inclusion of lands valuable for agriculture within National Forests in Colorado. The history of this foothills region shows conclusively that at least in this locality the National Forests failed to include an immense area of land so poor that no one would have it after many years of opportunity.

DURING the present summer the Extension work of the New York State College of Forestry will be developed along the line of woodlot improvement demonstrations. Calls for advice along this line have become so frequent that trips will probably be arranged in the fall to take in a number of woodlots in given localities. A trained Forester from the College will demonstrate methods of improving the stand by taking out unprofitable trees and planting rapidly growing species in large openings, and in simple methods of estimating the volume and value of woodlot stands.



ALONG LITTLE THOMPSON RIVER

A beautiful bit of road in the proposed addition to the Colorado National Forest.

These lands either have been or will be placed under the permanent care and management of the Forest Service following the Presidential proclamation. In spite of their poverty for agriculture, they will produce timber crops of great value, and their protection from fire and reforestation will have an immediate effect in regulating the stream flow and supplying additional water during the dry months when it is most needed.

The accompanying photographs show the character of lands to be added to the National Forests, and reveal both their possibilities for the production of timber and their absolute unfitness for agriculture.

The National Forest policy has come to stay. It has won on its own merits in Colorado, in the face of bitter and prejudiced opposition. The solid citizens of the West, whose interests lie in creating and maintaining conditions mak-

ing for stability and permanent prosperity, are behind the broad constructive policies of the Forest Service, and their influence is becoming increasingly important in overcoming the harmful activities of the elements whose principal aims are exploitation and speculation. The difference between mushroom prosperity incident to the rapid exhaustion of natural resources, and the slow but far more lasting and beneficial development resulting from the protection and renewal of the timber and forage by regulated use, is beginning to be recognized throughout the entire West, and, with this changing viewpoint, hostility to the National Forest policies has given way to a cordial and intelligent support and coöperation.

A TREE census has recently been taken by the school children of Binghamton, New York. The work was done in coöperation with The New York State College of Forestry at Syracuse University, and the information resulting will give the number of trees by streets, the species, condition, and other points valuable in working out a definite Shade Tree Program for the City. This work is done in accordance with the agreement of The State College of Forestry to coöperate in village improvement work along Landscape Engineering lines. Professor Henry R. Francis represented the College at Binghamton.

MIDSUMMER FLOWERS

BY DR. R. W. SHUFELDT, C.M.Z.S.

AS common a plant as the Dandelion is, with its great golden flowers (Fig. 1), how rarely do we see reproductions of artistic photographs of it, presenting it in all its splendor as we find it in nature! There is a very good reason for this. As a rule we find it growing close to the ground, and it generally requires a high order of patience to so place the camera that what we see of it is reproduced on the camera's ground - glass. Then, its brilliant yellow flowers require the use of a special plate, in that they may not photograph nearly black; and finally, if one attempts to dig up a plant in order to photograph it indoors, its big and long root

acts as a deterrent to its proper transplanting. If the root be cut in two an inch or more below the surface of the ground, the leaves and flowers wilt in a few moments, rendering them unfit subjects to pose before the camera in the botanist's studio. Neltje Blanchan refers especially to this latter character when she described that part of the Dandelion plant; she says: "Deep, very deep, the stocky, bitter root penetrates, where heat and drought affect it not, nor nibbling rabbits, moles, grubs or insects, and other burrowers break through and steal."

Where the climate is mild, or where mild winters occur from time to time, one may expect to see Dandelions from day to day throughout the entire year; this is often the case in Washington, D. C., where it is no uncommon thing to observe a flower of this species peeping above the snow in January; a layer of snow on the ground there may by no means be long lasting. Then, in this city, when spring comes around, these very Dandelions may appear in magnificent abundance. There was at least one marvelous outcropping of them on the broad

lawns of "Oak Lawn" of the Dean estate on Connecticut Avenue, in the very heart of the city. The million or more of flowers formed a close carpet of gorgeous, golden yellow that spread over several acres of ground, forming a wild-flower exhibit not easily forgotten.



FEW WILD FLOWERS POSSESS GREATER BEAUTY THAN THE COMMON DANDELION

FIG. 1.—One of the most abundant of all the *Compositae* is this golden beauty of the pastures, lawns, and waysides. Scientifically, it has been named *Taraxacum officinale* for the reason that its root has been employed for medicinal purposes; there are several other species of dandelions more or less nearly related to it. Originally, it was introduced from Europe; but at the present time it has spread over a large part of the world. The Dandelion has everything in its favor to spread its kind to all quarters of the globe; and it would seem that, in certain sections or even regions, it is becoming more and more abundant each year that goes by.

There are several species of Dandelions in this country, belonging to different genera, as the Dwarf Dandelion and the Tall Dandelion, which will be figured and described later on, should good examples come to hand.

In midsummer, throughout the eastern parts of our country and elsewhere, there is such a bewildering blossoming-out of flowers, of so many descriptions and in every con-

ceivable sort of place in nature, that it is no easy matter to make a choice at this season, in that the flora may be fully, or even fairly, represented. However, there are some flowers that must not upon any account be overlooked; and, abundant as the chosen flower may be, one can generally manage to find out something about it which is not very generally known. This holds true, for example, in the case of such a plant as the Pink Knotweed, of which a spray or two is here shown in Figure 2. Masses of its gorgeous pink flowers are to be seen along the roadsides, in the corners of pastures and fields and in many so-called waste places. Not one in a hundred who daily passes them even knows the common name of the plant, to say not a word as to its scientific name. Its rosy flowers are bundled together on erect spikes an inch or more in length, and they open in the most unmethodical manner here and there along the spike. Many insects are attracted to them, especially the smaller bees of the genus *Andrena*, fertilization taking place much as we find it in the common Buckwheat, to which group the Pink Jointweed belongs.

A little while after fertilization the seeds begin to form inside the calyx, which is likewise pink and persistent. They are almost black when ripe—flat, small, and sub-circular or cordate in outline. So deliberate is the blos-

their seeing "beauty" in the pink flowers of a "Smartweed," it is quite safe to say that, as a rule, they most emphatically do not; should they, perchance, see it and appreciate it, it is much to be doubted that it would even be admitted by any one of them. This should not cause us any surprise, for "weeds are weeds" to all cultivators of the soil, and in thousands of cases they are the chief menace to the annual success of their labors.

These Smartweeds, Jointweeds, Pink Knotweeds, or whatever we may choose to call them, of the Buckwheat family (*Polygonaceæ*) are a most puzzling group



PINK KNOTWEED IS A CONSPICUOUS JULY FLOWER

FIG. 2.—This plant has several common names besides the one given above, it being known in some sections as Common Persicaria, while to others it is familiar as Jointweed or Smartweed. Botanically, it has been relegated to the Buckwheat family (*Polygonaceæ*), where, according to Gray, it belongs in the genus *Persicaria*, it being *P. pennsylvanicum*; other botanists, while giving it the same specific name, retain it in the genus *Polygonum*. Its flowers, which are of a rose-pink color, sometimes tinged with greenish, are well shown in the cut, as are also its lanceolate leaves. The plant flourishes best in moist soil, though it is abundant everywhere on its range from July until late autumn, adding masses of color along the roadsides and in waste places in the rural districts. Single plants are sometimes very extensive or spreading, and may grow to be at least a yard in height. One of its chief characters is the stipitate glands found on the upper branches and on the peduncles. Jointweed flourishes from northern Maine to the Gulf, and westward to Texas and Minnesota. The butterfly in the picture is the Black Swallow-tail (*Papilio troilus*).

soming of this Jointweed that we can always find more buds and seeds than we can find flowers on any spike. *Polygonum*, which is the generic name for this plant and its allies, is composed of two Greek words, meaning *many knees*, which refers to the numerous joints seen to compose the stems of the plant.

In our country no plant has been more generally relegated to the order of "weeds" by farmers and other tillers of the soil than has this much-despised one. As to



THESE LITTLE WHITE BEAUTIES DECEIVED THE OLD BOTANISTS

FIG. 3.—Flowering Spurge (*Euphorbia corollata*); natural size. This is a specimen from southern Maryland; and, while the plant is found in rich and sandy soil from New York southward and westward, it has, of recent years only, been naturalized in New England. We generally meet with it in open fields from midsummer to October; and, when abundant, it is quite conspicuous, especially when it attains a height of thirty-six inches or more, as it often does. It can easily be seen at quite a distance. The true flowers, both staminate and pistillate, are surrounded, as we see in the picture, by a five-lobed corolla-like involucre. The early botanists mistook this latter for the petals of the true flower; but we know better now. Note that the branches are forked, and that the flowerheads are borne upon five-forked umbels. The leaves are not very large; they may be either lanceolate or ovate in outline, and always smooth. The Spurge family (*Euphorbiaceæ*) contains many species, some of which are very beautiful plants.

to study; there are dry land species, climbing species, amphibious species, and so on. Several of them present varieties, and this still further complicates their study. For example, Neltje Blanchan says: "When the amphibious *Persicaria* (*P. amphibium*) lifts its short, dense,

rose-colored ovoid or oblong club of bloom above ponds and lakes, it is sufficiently protected from crawling pilferers, of course, by the water in which it grows. But suppose the pond dries up and the plant is left on dry ground, what then? Now, a remarkable thing happens; protective glandular, sticky hairs appear on the epidermis of the leaves and stems, which were perfectly smooth when the flowers grew in the water. Such small wingless insects as might pilfer nectar, without bringing to their hostess any pollen from other blossoms, are held as fast as on bird-lime. The stem, which sometimes floats, sometimes is immersed, may attain a length of twenty feet; the rounded, elliptic, petioled leaves may be four inches long or only half that size."

There appear to be several subspecies—or varieties, as the botanists designate them—of this species, as *P. a. terrestre* and *P. a. hartwrightii*.

When we come to study the Spurge family (*Euphorbiaceæ*), we run into all sorts of curious plants, with still more curious flowers. Not a few of these are represented in the flora of our Atlantic States, from Massachusetts to Florida, inclusive, while in warmer parts of the world the array of the members of this family is simply enormous. If we chance to be crossing some barren and sandy field along in July and August, anywhere throughout the middle of its range, we are very likely to run into some of the Spurges of the genus *Euphorbia*, and most likely the Flowering Spurge (*E. corollata*), of which there is a fine specimen shown in Figure 3, collected in southern Maryland. Formerly this plant was found no farther north than New York, but of recent years it has become naturalized in New England, as far north as southern Massachusetts. East of the Mississippi Valley there are



THE GREEN TREE FROG (*Hyla cinerea*)

FIG. 4.—Should one be hunting for the flowers of some of the broad-leaved aquatic plants that flourish on the margins of ponds in any one of the southern states, the searcher is more than apt to meet with a big, green tree frog, which the herpetologists will tell you is one of the most conspicuous and interesting of its genus. This is *Hyla cinerea*. It has a near relative in *Hyla evitata*, which has thus far only been found near Washington, D. C.; we have but meagre knowledge of its habits. The Green Tree Frog, as its name would suggest, is of a brilliant pea green, verging upon a bright pale yellow. Upon either side it has an elegant stripe of white or pale golden yellow, the legs being similarly striped, the former being emarginated with black. It is one of our largest tree frogs, and certainly one of the most handsome. It thrives well in captivity, living upon flies and other insects; it is a noisy but not an especially active species. The specimens shown in the cut were taken near New Orleans, and were in the possession of the writer several days for the purpose of photography.

upwards of thirty species of *Euphorbia*, as the Sea-side Spurge, Milk Purslane, Snow-on-the-mountain, Painted Leaf, Wartweed, and the rest, while in this same family with our pretty little Flowering Spurge we find the famous Castor Oil plant (*Ricinus communis*), and several species of Mercury of the genera *Mercurialis* and *Acalypha*.

The flowers of the Flowering Spurge are both staminate and pistillate kinds, and, strange to say, the plant is rather closely related to the elegant Poinsettia, with its gorgeous scarlet or vermilion flowers—a plant we not rarely have the opportunity to admire in the show windows of the establishments of first-class florists. Flies of various species are the insects most often responsible for the fertilization of the Flowering Spurge, and they carry the pollen from its staminate flowers to the pistillate ones—minute and delicate little structures situated in the centre of the showy, though small, white involucre. Some of the *Euphorbia* are poisonous plants, and, according to Alice Lounsberry, "the medicinal properties of spurges are said to have been discovered long ago by King Juba of Mauritania, in Africa, and to be equally well known to our own Indians; they have not altogether the sanction of many for such use. It is certainly true that, aside from its powers of purging, the plant possesses little

virtue." However this may be, it is very important that we know these interesting plants in our fields when we meet with them.

In Figure 5 we have a very pretty specimen of Bouncing Bet (*Saponaria officinalis*), a flower that has been saddled with many names, most of them as inappropriate as the vernacular one just given, as Soapwort, Hedge Pink, Bruisewort, Old Maid's Pink, and Fuller's Herb.

Originally the plant came from Europe, introduced into our gardens, from whence it has escaped to establish itself along the highways in the country districts throughout a very wide range of our country. In many localities it is very abundant and flourishes luxuriantly. In old days it was supposed to possess medicinal properties, the idea having gained ground from the fact that its leaves, when bruised, will form a soap-like lather when agitated in water. Many moths and other insects help to fertilize its flowers, and the plant also propagates through its underground runners. This latter means often accounts for our finding the plant growing in colonies in some waste fence corner along the roadside. A popular writer at hand says: "It was always a mystery to Dickens that a door nail should have been considered so much more dead than any other inanimate object, and it seems also strange that this plant should have suggested the idea of bouncing more than other plants. Dear Bettie does not bounce, nor could she if she would. She sits most firmly on her stem, and her characteristics seem to be home-loving and simple. We are sure to find her peeping through the garden fences, or on the roadside, where the children nod to her as they pass by. She is one of the best loved of our waste-ground flora."

It would appear that the common double variety of this plant is the original cultivated species, and the single variety is its more simple and wild form derived from it—the plant that usually occurs along roadside, far from any country garden patch. The flowers of Bouncing Bet are sometimes of a bright pink color, and as a rule they possess a certain spicy fragrance, which some writers speak of as "an old-fashioned odor," whatever may be meant by that term. In typical flowers, the distal ends of the petals are scalloped, a fact that lends to them a still nearer resemblance to a Pink, though, as a matter of fact, this resemblance is never very close.

The leaves of Bouncing Bet are smooth and from three to five-ribbed, and have an ovate or even oval-lanceolate outline. The most interesting relatives of the *Saponaria* are the Campion or Catchflies—curious plants with very interesting histories. Their generic name is from a Greek word meaning *saliva*, which refers to the viscid juice found in the calyx and stems of some of the species; in this small insects are frequently entangled.

Some of the wild carnations also belong to this Pink family, and some of these have been domesticated for ornamental purposes.

EASTERN FOREST RESERVES BOUGHT

THE National Forest Reservation Commission has approved the purchase of 51,916 acres of land in the White Mountains and Southern Appalachians for inclusion in the National Forests of those regions. The two largest and most important tracts whose purchase was authorized are one of 11,000 acres on the White Top National Forest in Smyth County, Va., and another of 10,000 acres on the Savannah National Forest on the Tallulah River in Rabun and Habersham Counties, Ga. The purchase of three additional tracts, with a total of 1203 acres, was authorized on the Savannah National Forest.

On the White Mountain National Forest 11,270 acres, chiefly in Carroll and Grafton Counties,

N. H., were approved for purchase. By the acquisition of this land the purchases which have heretofore been made in the White Mountains are connected and rounded out.

The purchase of 40 different tracts comprising approximately 7750 acres on the Alabama National Forest in Lawrence County, Ala., was ordered. This will raise the total Government holdings on this forest to about 30,000 acres. In Rockbridge, Amherst, and Botetourt Counties, Va., 7454 acres were approved for purchase.



BOUNCING BET, THE FLOWER OF THE DUSTY ROADSIDES

FIG. 5.—This well-known flower is also called "Scapwort," hence its scientific name *Saponaria* (*sapo*, soap), it being *Saponaria officinalis* of the pink family (*Caryophyllaceae*); the "Cowherb" is the only other representative of the same genus (*S. vucerna*). Both plants came originally from Europe, and, as Gray remarks, they are "coarse annuals or perennials, with large flowers," having in their stems a "mucilaginous juice forming a lather with water." In the Pink family, in this country, also occur several species of Carnation plants (*Dianthus*); the Campions and Chickweeds, of which there are many kinds; the Scurry, Pearlworts, and a number of species of Sandworts; finally the Corn Cockle, which has already been described and figured in AMERICAN FORESTRY (May, 1917). The insect shown on the flower below the crowning bunch is one of the Damsel-flies of the Dragon-fly group (*Calopteryx*); it is the black species of feeble flight, so frequently seen about the small streams that find their way through the shady forests of Eastern United States. Dr. L. O. Howard says that their "large pop-eyes which seem almost stalked like those of a crab" are distinctive of them.



TREE PLANTED BY PRESIDENT LI YUAN-HUNG OF CHINA

A group of high Chinese officials taken just after the ceremonial observance of Arbor Day at Peking, China, on April 5th. President Li Yuan-hung is seen in the centre of the picture, behind and slightly to the right of the tree he has just planted. The stone tablet bears the inscription in Chinese "Planted by the hands of President Li." The Premier, General Juan Chi-rui, is seen in uniform at the extreme right. Between him and the President are Mr. Jao Chang-shang, Chief of the Department of Agriculture and Forestry (on the left), and Mr. Ngan Han, well-known to American foresters and to whose influence the adoption of a national Arbor Day in China was largely due. Behind the tree at the left is Dr. Chen Chin-tao, Minister of Finance.

FORESTRY PROGRESSING IN CHINA

FORESTRY propaganda in China is making steady progress and producing results increasingly important. Indications of the growth of interest in reforestation are manifested throughout the nation and from various sources AMERICAN FORESTRY is in receipt of information, proving that this long neglected subject is now receiving the attention it deserves. In official circles and elsewhere the republic is awakening to the necessity of making up for the laxity that has caused China to be looked upon as the horrible example of indifference to the importance of forest development and conservation.

Not the least significant incident along this line was the personal participation of President Li Yuan-hung in the Arbor Day exercises in the Temple of Heaven at Peking, April 5. Information concerning this celebration comes in a letter from Mr. W. F. Sherfesees, an American, who is now Adviser in Forestry to the Chinese Government. Mr. Sherfesees writes that this was the first time a ruler of China had taken part in exercises of this nature and adds that it was unquestionably the President's intention thus to invite national attention to the importance of forestry in the republic. The day was observed as a national holiday, and similar exercises took place in all of the provincial capitals and in most of the cities of lesser importance.

"President Li is an ardent friend of forestry," adds Mr. Sherfesees, "as indeed he is of whatever promises to promote the economic and social welfare of the people, and never misses an opportunity to express his interest

in, and to exert his influence in favor of, the work. Especially at this time of crisis in international affairs, when the president is overwhelmed with pressing important matters of all kinds, it was no slight sacrifice on his part to devote the time and effort to making the occasion one of national prominence; and to him is due the gratitude of all friends of Chinese forest conservation."

Clippings from Chinese papers, enclosed with Mr. Sherfesees's letter, describe the Arbor Day ceremonies in detail and make it clear that the event was regarded as of great national importance. The *Peking Gazette* speaks of the celebration as one that should go down in history as marking another milestone in the progress of the first republic in the Far East. "Until yesterday," says this paper, "the prayers offered by the rulers of China, imperial and republican, had been in the form of words and burnt offerings. Yesterday it took the form of a practical demonstration. The occasion records in actual deed the fact that China no longer dreams of prosperity pouring down from heaven without the people lifting a finger, but believes that prosperity must come with work—actual work of the hand. The most remarkable fact is that it was the President, the chief executive and representative of the country, who made this demonstration. Nor was it a perfunctory act that was gone through to show the people that their ruler was not idle. The example set by the president was immediately followed, eagerly and sincerely followed, by hundreds of others who were privileged to take part in the ceremony. The rush for



THE CENTRE OF LAI-AN

The Kuli hsing ting gate marks the centre of the town where Dr. Baillie's colony is established.



NORTH GATE OF LAI-AN

Showing character of the houses and the streets in the village whose people have started a forest nursery.



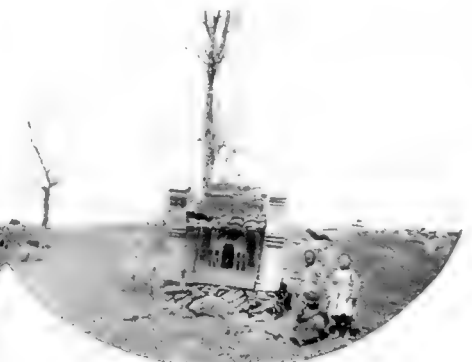
LU TI MIAO SHRINE

An old shrine near the village which is but little shaded by a feeble tree which cannot live much longer.



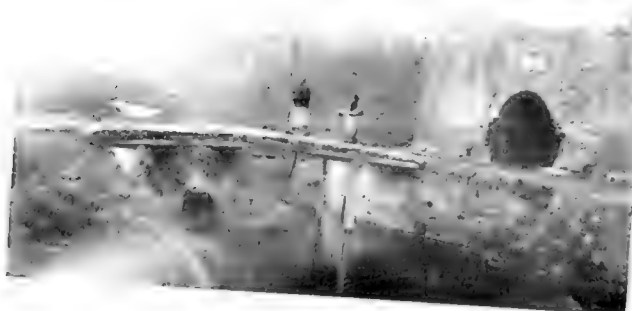
FAMINE REFUGEES

These people are entering the village from the famine stricken country. The family property is all on the wheelbarrow.



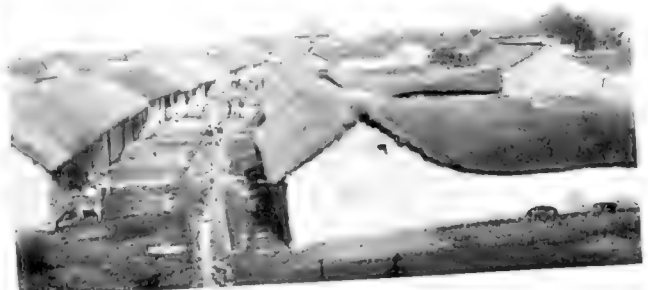
PU SHU SHRINE

A small shrine along the roadside a short distance outside the gates of the village of Lai-an.



SOUTH GATE OF LAI-AN

Showing the old town walls and the moat which constitute the town's chief defences against an enemy.



MAIN STREET OF LAI-AN

Dr. Baillie speaks feelingly of the filth and destitution of this walled village which is called a city.

VIEWS OF LAI-AN COLONY, CHINA, WHERE A FOREST NURSERY HAS BEEN ESTABLISHED



STOCK FOR THE LAI-AN NURSERY

This stock sent from the University of Nanking, the magistrate paying half and the colony half the cost.



THE LAI-AN FOREST NURSERY

Magistrate Wan, in black and white, directing the work of establishing the nursery near the village.



REFUGEES IN A HUT

These people fleeing from the country took refuge in a hut under a ginkgo tree on the nursery plantation near Lai-an.



THE MEN RESPONSIBLE

Magistrate Wan of Lai-an, Dr. Bailie and Mr. Best, the men whose efforts resulted in the forest nursery being established.



CHURCH AND PAGODA

These places are some fifteen miles from Lai-an, but on the road to it, and are very well attended by the villagers and others.



THE NURSERY GROUND

After a conference the plot of ground here shown was selected for the location of the forest nursery.



A LAI-AN BACK YARD

The donkeys so much used in China are kept so close to the kitchen door that they are the chief back yard ornaments.

seedling plants was so great that many went away disappointed because they were unable to plant trees with their own hands."

Small cypresses were planted by the President and by all the members of his cabinet with the exception of Minister Wu Ting-fang. Other high officials of the government followed his example. After the ceremonies citizens and school children planted all the trees that had been provided for the occasion.

Since Mr. Sherfese's letter was written internal troubles have arisen in China. Imperialists have overthrown the government and have been in turn assailed by the Republicans.

One of the most important examples of the Chinese interest in forestry matters is afforded by the success of the Colonization Association in its work on Purple Mountain. This association was the outgrowth of relief work undertaken in 1911 by Dr. Joseph Bailie, Instructor in Forestry at the University of Nanking. The organization owns 1000 acres of land on the north-west slope of the mountain, and this property enables it to carry out its plan of providing work for the poor and at the same time give the workers the benefit of the fruits of their industry. The men have been employed in digging canals, removing stones, making roads, levelling uneven places and converting a waste area into an orchard and plantation of mulberries. Much opposition was experienced during the early stages of the work, but this has been replaced by complete confidence and coöperation. Undertaken as a means of giving succor to sufferers from famine, the association has proved the soundness of its plans and has put to profitable use large areas hitherto idle. It has given temporary employment to thousands, and many families now gain a permanent and comfortable livelihood on land which otherwise would have remained indefinitely unproductive. It has resulted in the establishment of a comprehensive course in forestry at the University of Nanking and has served to arouse interest in other and possibly larger projects of reforestation throughout the republic. Under date of May 20, Dr. Bailie writes from the University:

"I made a trip to Lai-an Colony, where we have over 80 families, numbering over 400 people, now independent. The object of my visit was to establish a nursery for our

Colony to enable the colonists to plant trees on those lands that are too steep or too stony for cultivation. I had also hopes to be able to extend the Colony. In this latter object I was foiled. When we took the 80 families—refugees—from the farmers for whom they were working in 1914 and put them on the mountain, wages for the next harvest doubled, and have never gone down

below a living wage. The farmers contended that if we open another mountain wages will go up again. We have proved that if the lands are thrown open the poor can maintain themselves even if the lands are second or third rate.

"We were successful in opening our nursery. The official had heard that I was going up to start it, and he requested me to bring some trees and seeds along for him as he also wanted to open a nursery. In two of the pictures which I send along the bundles of nursery stock are seen outside of Mr. Best's gate. We sent up from our University nursery robinias, melia azederach, maple, pines, thunbergii, sophora japonica, pistachio chinensis, gleditsia and ginkgo biloba, besides a few of the other species.

"The official after some conferences arranged to

have a meeting at Lo-an temple, which is the administrative centre for our Colony and is distant from Lai-an about eight miles. Though the temple belongs to the association, he invited us all as his guests, and provided a horse for Mr. Best and a chair for me. He himself went ahead in a chair. After some deliberation on the spot it was decided that the official coöperate with our association and that he give half of the expense and the association give half. Mr. Yu, who is the caretaker at Lo-an temple, and the manager among the colonists under Mr. Best, has done such good work that he is made the head of the nursery, and the official has been much pleased by his management for over two years.

"A photographer took a number of pictures on this trip and I send you several of them. You will see how squalid a place Lai-an is and the self-denial involved for Mr. and Mrs. Best in making it their home instead of remaining in civilization. It is simply like going into heaven to get into Mr. Best's mission compound after being out in the filth and destitution of this walled village called a city."

Acknowledging a copy of the constitution and by-laws



ARBOR DAY IN CHINA

President Li Yuan-hung (indicated by a cross at the foot of the steps towards the right) and his party leaving the Chai Kung on his way to perform the tree-planting ceremony on Arbor Day in China. This temple is situated within the enclosure of the Temple of Heaven, Peking, and it was here that the Chinese Emperors used to fast before proceeding to the Altar of Heaven to offer sacrifice.



TEMPLE GIVEN TO LAI-AN COLONY

If the presentation had been delayed a few days all the trees surrounding this Ta an Temple would have been cut down.



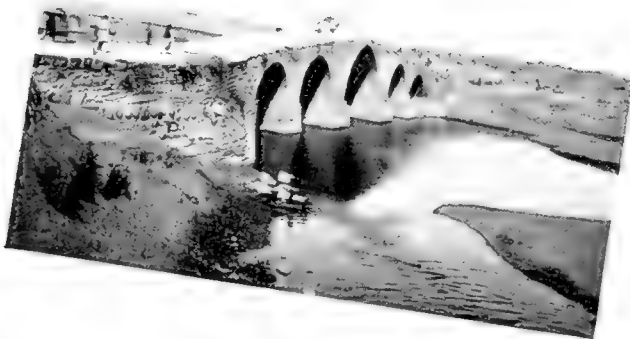
SHRINE OF THE GOD OF FARMING

Note how religiously the trees surrounding this temple have been preserved despite great need of firewood.



INTERIOR OF TA AN TEMPLE

The tree banked up with stones is a knei hua and over 500 years old. When in bloom its fragrance is perceived three miles away.



BRIDGE NEAR CHU CHI

Owing to deforestation the floods in this region are so great that in flood times this bridge is impassable.



EN ROUTE TO TA AN TEMPLE

Dr. Baillie in a chair and Mr. Best on horseback on the way to the Temple presented to the Lai-an Colony.

of the American Forestry Association, Mr. D. Y. Lin, Executive Secretary of the Conservation Division of the Young Men's Christian Association of China, writes from Shanghai:

"I am sure this booklet will be of great help to me in my attempt to get a Chinese forestry association firmly established. I shall be very glad to tell you later, in detail, how I have been working to interest prominent men in this country in such a movement.

"After my lecture campaign in Nanchang, I went to Wuchang, where altogether nine lectures were given. The total attendance was 3580. Military Governor Wang Jen-Yoen, who is also civil governor for Hupeh, presided at the first meeting, and his interest certainly gave a good start to the campaign in Wuchang. Results of the Wuchang campaign may be briefly stated as follows:

"1. The governor issued circulars to different districts urging local magistrates to do a certain amount of planting every year and asking the different taoyin to supervise the work.

"2. An appropriation for extension work to be done by some government agricultural students during the summer time has been granted.

"3. A bureau for the promotion of forestry in Hupeh will be inaugurated in the Agricultural Society.

"Leaving Wuchang I went direct to Changsha, Hunan. It was in this province that preparations for a forestry lecture campaign were most complete. The governor gave \$150 to defray expenses for running a local campaign in Changsha. The Hsien officials were notified. Arrangements for a trip through the province were made. Altogether 15 lectures were given in Changsha and as many as 5912 people attended these lectures. The gover-

nor was so pleased with the results in Changsha that he appointed one of his secretaries to escort me through the province and urged me to lecture in as many of the interior cities as possible. Four cities were visited and I lectured in three of them. Coming back to Changsha I was asked to inspect Yaloshan, where the famous generals, Huang Hsing and Tsia Oa, are buried, to see what could be done to reforest, or, rather to beautify, the mountain.

"Perhaps the most important lecture in Changsha was the one before the provincial assembly. The lecture was arranged by the governor and the Commissioner of Industries, who wished to see that the assemblymen would take a greater interest in agriculture and forestry and would appropriate more money for the work for the entire province. The lecture was a success and it was followed by some most interesting discussions as to what ought to be done at once on Yaloshan and throughout the Hsien cities. There is every reason to believe that forestry work in Hunan will have a good start this year. The results of the Hunan forestry campaign may be summarized as follows:

"1. Five cities were visited, 19 lectures given, and 7912 people reached.

"2. A forestry association for Hunan was started.

"3. A forestry essay contest will be conducted to encourage the study of forestry among Hunan students.

"4. Two men have volunteered to carry on lecture work in the country towns, and three sets of my lecture outfit have been ordered.

"The results of such forestry lecture campaigns in Kiangsi, Hupeh and Hunan during the last two months are indeed encouraging."

FORMS OF LEAVES

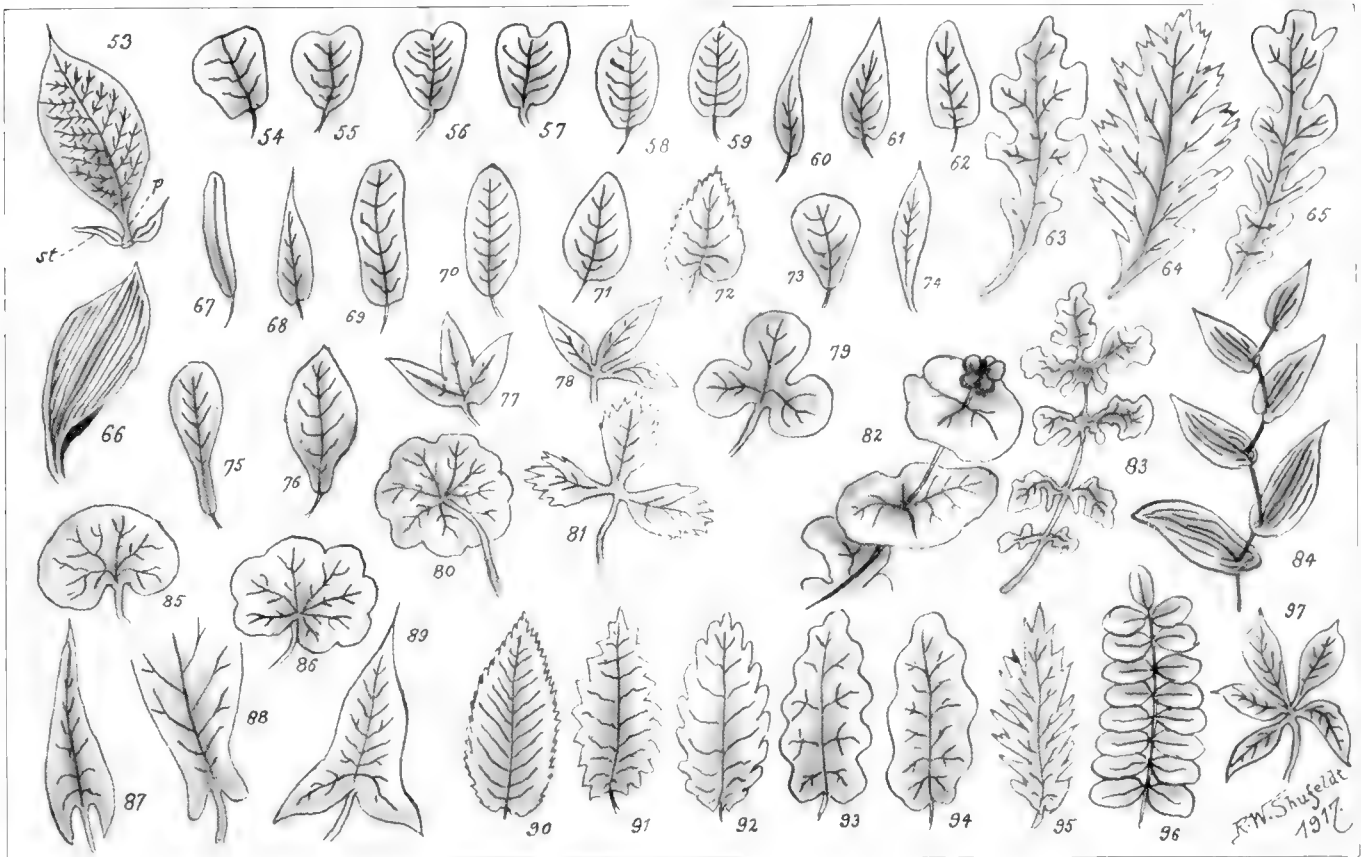
A PERFECT and typical leaf (Figure 53) consists of its expanded part called the *blade*, which frequently has a foot or leaf-stalk termed the *petiole* (*p*), and a pair of *stipules* (*st*); sometimes the blade is called the *lamina*. In Figure 53 the midrib, veins, and veinlets are well shown. There are two principal types of this veining: the netted-veined and the parallel-veined (Figure 66). The significance of this is extremely important; moreover, it has much to do with the form assumed by leaves in general.

Leaf-forms are well-nigh infinite; but they may be so classified as to be referred to specific kinds, for which a terminology is highly necessary. This terminology is also applied to other parts, as the petals of flowers, and so on. Most all leaves have a base and an apex with respect to the stem, and these vary in general contour as well as in their margins. As to the apex, it may be *truncate* or square across (Figure 54), *retuse* or indented (Figure 55), *notched* or *emarginate* (Figure 56), *obcordate* or deeply notched at the apex, causing it to be inversely heart-shaped (Figure 57). Then they may be *cuspidate*, where the apex is rigidly

spined (Figure 58), or *macronate*, where this spine is small, perhaps a mere extension of the midrib (Figure 59).

As to the general form of the leaf, it may be *linear*, that is long and narrow (Figure 67), *lanccolate* or lance-shaped (Figure 68), *oblong* (Figure 69) and *elliptical* (Figure 70), as well as *ovate* or egg-shaped (Figure 71), and *cordate* or heart-shaped (Figure 72). When the leaf tapers to an acute angle at the base, being broad above (Figure 73), it is said to be *cuneate* or *cuneiform*, and when it is inversely ovate, it is said to be *obovate*, as in Figure 76. Then the outline may be *spatulate* (Figure 75), also *oblanccolate* (Figure 74), which is lance-shaped, with the small end at the base—the reverse of Figure 60.

Passing to the form of the base, it may be *reniform* or kidney-shaped (Figure 85), or *peltate*, shield-shaped (Figure 86), as in the white Water Lily. If the margins at the base of this leaf are brought together, we have another shield-form (Figure 80), which is the Marsh Pennywort. A leaf may be arrow-shaped or *sagittate* (Figure 87), *auriculate* or eared (Figure 88), as well as *hastate* or halberd-shaped (Figure 89).



Then we may have simple or compound leaves, all in one piece in the first instance, or divided up into two or more pieces springing from a single stalk, when they are termed *compound* leaves; an enormous number of patterns represent these two divisions. With respect to other outlines, the leaf may be *entire*, that is with unbroken margin; but when this margin is saw-toothed, it is said to be *serrate* (Figure 90). When the teeth point outwards, it is *dentate* (Figure 91); if the margin be scalloped it is said to be *crenate* (Figure 92), and if wavy it is *undulate* (Figure 93). If markedly wavy it is *sinate* (Figure 94). Finally, the margin may be *incised* or jagged (Figure 95).

Sometimes leaves are more deeply cut than this, when they are said to be *lobed*—the projections being called lobes—and they may thus be 2-lobed, 3-lobed, many-lobed, etc. Simple lobed leaves are shown in Figures 63 and 79; when sharply lobed it is *cleft* (Figures 64 and 77), and such leaves may be *bifid*, *trifid*, *quadrid*, etc., even *multifid*, giving rise to segments to correspond. If not cleft, the leaf may be parted by deeper incisions extending almost to the midrib (Figures 65 and 78); so we have them 2-parted, 3-parted, multiparted, etc. Should the incisions reach the midrib, the leaf is said to be divided, that is *bisected*, *trisected*, and so on (Figures 81 and 83). Figure 97 shows a *palmate* leaf, or five leaflets (Sweet Buckeye).

To describe the degree as well as the mode of division, other terms are employed, as feather-veined, that is *pinnately-veined* and *radiate-veined* or *palmately-veined* leaves. Figures 63, 64, 65 and 83 are examples of the first, and 77, 78, 79 and 81 examples of the second. Such terms as *palmately lobed* (Figure 79), *palmately cleft* (Figure 77),

palmately parted (Figure 78), and *palmately divided* (Figure 81) are self-evident.

Compound leaves exhibit leaflets as in Figure 96 which are said to be *pinnate*; there are also palmate compound leaves, sometimes called *digitate* (Figure 97). Compound leaves like in Figure 96 may have one or two leaves at the distal end of the stem, or terminate in a tendril as in the common garden pea. A variety of other terms are employed to describe the compounding of leaves; for example, the foliage of the Meadow Rue is said to be *ternately-decompounded*. But space will not admit of giving more of them here.

Perfoliate leaves is where the stem seems to run through or perforate the leaf near its base (Fig. 84, Bellwort); this is definitely so in the lower leaves, and less so as we ascend toward the end of the stem, where the last leaf is *sessile*. Sometimes the perfoliation is due to two leaves amalgamating (*connate-perfoliate*), as in true honeysuckle vines (Figure 82), and here the perforations disappear as the main stem is approached.

A SIGNIFICANT indication of the interest taken in forestry in California is the popularity of a course in Elementary Forestry at the University of California. This course is designed, not for the professional forestry student, but to supply information on forestry matters and methods for its general educational value. Seven colleges of the University are represented in the enrolment—Letters and Science, Agriculture, Commerce, Chemistry, Civil Engineering, Mechanical Engineering, Mining. Statistics recently compiled show that during the past year 382 different students have been under instruction by the Forestry Division, including both those in professional and in non-professional courses.

ORNAMENTAL SHADE TREES AND THEIR CARE

BY HOMER D. HOUSE

STATE BOTANIST, NEW YORK

IT cannot be said with any degree of propriety that trees are really at home along city streets. They belong in the forest, and when planted for shade or ornamental purposes are confronted with a new set of conditions, which make life anything but a simple proposition for them. It is not unlike the problems which confront the citizen of a forested, rural community who for the first time finds himself obliged to cope with the confused life of a big city.

In this brief discussion of trees I must confine myself largely to the subject of the proper selection and care of trees best fitted for shade and ornament along the streets of cities and towns. The particular species of trees most suitable for this purpose varies considerably with the climate of the various portions of the United States and Canada, but certain general principles regarding their selection and care apply everywhere. In the use of trees for street shade there are certain requirements and conditions which do not permit of very great diversity of kinds, as compared with the number of trees which can be used for shade and ornament in parks and private estates. Allowing for certain minor differences in soil, exposure, and drainage, conditions to which trees along streets are subjected are apt to be generally uniform in any one section of the country, and experience has demonstrated the supreme fitness of certain trees and undesirability of others.

The proper use of a few hardy and desirable shade trees is preferable from every point of view to the indiscriminate and improper use of a great variety of trees, some or many of which are entirely out of place as street trees. So much has been written about the good points of our native and introduced trees that it seems like needless repetition to point out the characters which make them most desirable for street trees.

It is useless to plant trees which are not hardy or not adapted to the soil or able to withstand wind, snow, and ice, and these latter conditions may vary consider-

ably in different portions of the East and North. The most desirable are those trees which suffer least under city conditions from insect and fungous attacks. Some trees, like the basswood and maple, suffer from leaf-burn when over a light-colored pavement. Some trees do better in clay than in sandy soil. These factors must be taken into careful consideration in the selection of trees for any particular street.

Trees which do not harmonize with the width of the street and the character of the buildings do not accomplish the purpose of beautifying the street, which is about as important as the shade which they may give. Tall, overtopping elms are not beautiful on a narrow street where houses are close to the street. For such situations trees of moderate height, growth and with slender crowns are appropriate and beautifying to an otherwise unsightly street.

Our city streets are often too full of trees like the Carolina Poplar, Box Elder, Silver Maple, and Aspens, planted by well-meaning but thoughtless people to secure quick shade in places where with a little care a Norway Maple, Sycamore, Red Oak, or Elm would have attained almost as quickly a shade-giving size and a permanency of many years. The fast-growing trees are apt to be short-lived. They are also usually the cheapest, and many people plant them for that reason. This emphasizes the importance of having all street



THE BEAUTY OF THE MAGNOLIA

This tree, most artistically placed near one of the entrances to Franklin Park, Washington, D. C., illustrates the perfect adaptability of the magnolia for such use.

tree planting under the charge of a city forester, who will set out the proper kinds of trees as soon as the street is laid out and paved.

If the houses are close to the street and close together, dense shade is not desirable. Lawns, walks, and buildings need sunshine. Under such conditions, trees like the Norway Maple if planted close together give too much shade and prevents grass from growing. A tree with thin foliage, like the Ash, White Birch, or Locust, is most desirable for such streets, although local conditions may permit Norway Maple planted at greater

distances and occasionally pruned, or the use of Sycamore, which will stand a lot of pruning.

Several trees, otherwise very attractive, are often a nuisance along streets because they litter the walks and pavements with bloom or fruit, send up suckers, or attract insects. The Silver Maple has a bad and well-deserved reputation for breaking up pavements and walks. The Honey Locust litters the pavement with slippery pods, and the fruit of the Mulberry and Shadtree are objectionable for the same reason. The fruit and foliage of the Horsechestnut cause quite a litter, and often the foliage is diseased in summer, causing it to turn brown and fall prematurely. With proper care, such a condition may be obviated and the litter of the fruit tolerated for the sake of the beauty of the flowers, foliage, and shape of the crown, since few trees surpass the Horsechestnut in these respects.

To obtain beauty in street planting there must be harmony between the trees and their surroundings. This is best obtained by using, as far as possible, trees of one kind upon a single street or block, and trees of a character that are best adapted to the width of the street and other conditions. Since the city street is not the native home of the trees, we cannot expect absolute perfection, but, excluding evergreens, it is possible to select and plant those trees most suitable for the conditions presented.

For wide avenues or boulevards, there is probably no one tree that is so satisfactory both as to size and beauty as the American Elm. On wide avenues or boulevards with a central parkway, two rows of elms may often be used, and flanking them on either side and planted on the curbing a very good effect can be obtained by rows of Sycamore, Norway Maple, Pin Oak, Green Ash, or Basswood, if the houses are comparatively close to the street. If the houses are well back from the street,

larger growing trees may be used, such as Red Oak, Scarlet Oak, Sugar Maple, Tulip Poplar, in addition to the row or rows of elms in the central parkway.

For avenues without parkways, but with broad curbing and at least 100 feet between the building lines, there is a wide range of appropriate trees, leading off, of course, with the Elm, Sugar Maple, White Oak, Red Oak, Tulip Poplar, Scarlet Oak, Red Gum, American Basswood, Cucumber-tree, and others.

For the ordinary street, which is 70 to 90 feet wide between the building lines, trees which do not attain the largest and most majestic growth of crown are most beautiful. For such streets there is no more appropriate tree than the Norway Maple, although circumstances and taste may with equal propriety dictate one of the following: Sycamore, Sycamore Maple, Basswood, White Ash, Ginkgo, Horsechestnut, Red Gum, Pin Oak, Red Maple, Honey Locust, or Hackberry.

For narrow streets, 70 feet or less between the building lines, the number of suitable trees is very limited, and even some of them will require skilful pruning as they attain their growth to keep them in harmony with their surroundings. The best trees for this class of street are the European Linden, Red Maple, Green



Courtesy of N. Y. State Conservation Commission.

LOMBARDY POPLAR, ROCHESTER, N. Y.

Entirely too stiff and formal, and not at all suitable for street tree planting, save perhaps under most unusual conditions.

Ash, Hackberry, Japanese Maple, Ginkgo, Red Bud, and Shadtree. The use of Norway Maple and Sycamore on narrow streets is very often productive of good results where they are kept trimmed.

The above paragraphs contain scarcely any mention of several trees common on city streets. For one reason or another they should not be used where it is possible to use one of the trees which experience has shown to be the best. Beech is not desirable because of its dense shade and slow growth. The Chestnut is susceptible to the chestnut blight disease, for which no control has

been found, and along with all large nut-bearing trees, like the Walnut, Butternut and Hickory, are not desirable along streets. The Black Locust (*Robinia pseudo-acacia*) suffers so severely from the attacks of the Locust borer and consequent decay that it is poor policy to make any but a very limited use of it. The Willow is not adapted either by its form or durability as a street tree.

I can well imagine that there are conditions which demand the use of trees of rapid growth, trees which ordinarily should not be used along streets. I have seen many factory streets, railroad grades through cities, and other con-

ditions where I would not hesitate to use the most rapid-growing tree available, to act both as a screen and to give shade. There are conditions where the necessity for a screen of foliage and for shade takes



Courtesy of the N. Y. Conservation Commission

A TREELESS STREET

This is difficult to treat, but sycamore or Norway maple, if planted and kept carefully trimmed, would do much to destroy the ugly vista.



Courtesy of the N. Y. Conservation Commission

A STREET PLANTED WITH WHITE BIRCH

Could anything be more inviting, restful, or pleasing to the artistic sense than this tree planting? Contrast it with the one above.

precedence over beauty and length of life. The Ailanthus, Carolina Poplar, Black Poplar, Lombardy Poplar, Horsechestnut, Box Elder, and several other rapidly growing but comparatively short-lived species are eminently fitted for such purposes. Sometimes it is possible to alternate these trees with slower-growing but longer-lived trees which when they attain sufficient size may be left,

complications which frequently make them very easy victims to a wide range of injuries. Many, if not most, of the injuries which lead to the death of street trees can be prevented. They can only be prevented, however, by proper municipal control of the causes or agencies which produce the injury and a more extensive public-spirited effort to aid such protection.

It would be almost impossible in a short space to enumerate the kinds of mechanical injuries to which street trees are subjected. Trees close to the curbing are subject to abrasion by passing vehicles, or abrasion may be caused by the piling of flagstones or paving blocks against the trees. I have seen this sort of injury in cities with most efficient city foresters and park superintendents. If they are powerless to prevent such injury, or overlook the matter, such cities still have some progress to make in the care of their trees. Horses when hitched to a tree close to the curbing will almost invariably gnaw the bark. All of these injuries, while more or less preventable, indicate that absolute prevention may only be secured perhaps by the use of iron palings around all trees upon the curbing.

Careless telephone men, in spite of the definite orders



Courtesy of N. Y. State Conservation Commission.

AN ATTRACTIVE ROW OF NORWAY MAPLES

This exemplifies the practical value of the Norway Maple, than which it would be hard to find a better tree for roadway or street planting.

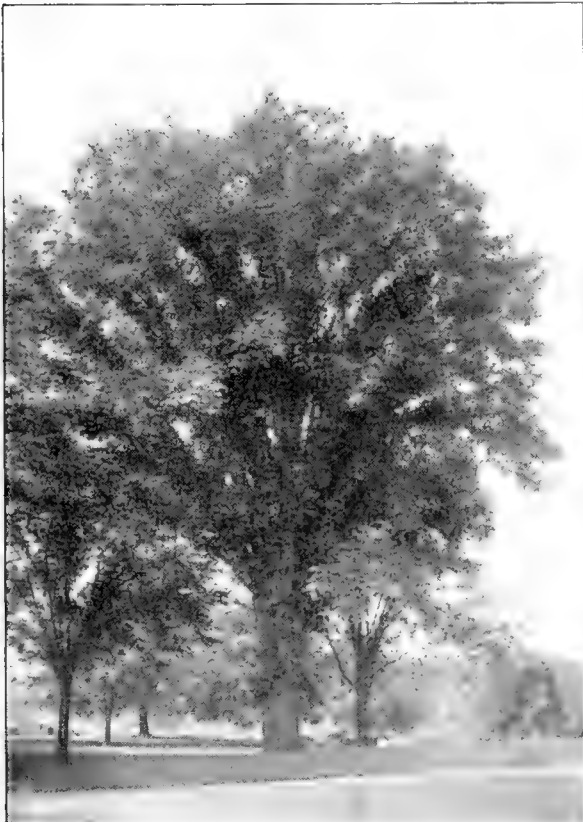
of all telephone companies to the contrary, frequently use their climbing spurs in ascending trees. Important roots are often cut off and destroyed by the laying of curbs, gas and water pipes.

All injuries of these kinds, as well as a wide variety of other mechanical injuries to either trunks or roots, result in the formation of decayed spots, which if neglected will sooner or later shorten the life of the tree.

Escaping gas causes the death of many city trees, especially where the gas mains are laid under or close to the sidewalks as they are in some cities. Even when the main is under the pavement, the connecting extensions to the dwellings on either side often become defective and the gas escaping into the soil frequently causes the death of surrounding trees before the leak is discovered and repaired. Greater care in the use of better pipes and better joints seems to be the only solution of this sort of damage, which probably kills more city trees than any other one agency.

In wet weather or during storms, lighting wires, carrying an alternating current, will cause serious damage to trees, when the loss or abrasion of insulation makes direct contact possible. This trouble is easily detected and easily remedied, and in cities where any degree of care is taken of the lighting installation serious injury to trees from this cause is rare. High-tension, direct-current-bearing wires, if brought into contact with trees, will kill them the same as by a lightning bolt striking the tree. Hence such wires should be most carefully insulated when near trees, and, what is safer for both trees and human beings, placed under ground.

It seems absurd to class pruning among the injurious agencies of trees, but a casual inspection of the trees in almost any city appears to indicate that careless and improper pruning has accomplished great damage. There is a right and a wrong way to prune trees, and a saw, an ax and a little muscle are not all the requirements for correct pruning of trees. When cut



Courtesy of N. Y. State Conservation Commission.

A MAGNIFICENT SPECIMEN OF THE AMERICAN ELM
Most beautiful of all shade trees, in the opinion of many, and undoubtedly ideal for planting of broad streets and avenues.

close to the trunk and not supported, a heavy limb will split down the side of the trunk before it is completely severed from the tree. This split of exposed wood is difficult to prevent from starting to decay. If the branch is cut too far out, a stub is left which will decay and extend its decay into the heart of the tree. Proper pruning demands that the limb be supported by ropes until severed from the trunk by a cut made some distance out from the base of the limb, and that the stub thus left be cut off close to the trunk and painted or treated with some preparation which will prevent the start of decay before it heals over.

The use of cement fillings for decayed spots in street trees is doubtless too expensive, if well done, to be practicable on a large scale, however desirable it may be as a treatment for privately owned trees. For certain city-owned trees of exceptional size and beauty, it is worth all that it costs. For the ordinary street tree, it is probably best, in the long run, to merely remove the decay, giving the interior sufficient ventilation to check to some degree the progress of decay. In many cases, where the tree is badly decayed, it is best to remove the tree and plant a good-sized healthy young tree to take its place. That such trees need care is obvious. What care they will receive depends much upon the funds available and the tastes and desires of those in charge.

Space need not be taken here to diagnose the numerous insect and fungous attacks upon trees. The more serious of them have received careful study in many quarters. The fact that with all of our knowledge of shade-tree insects and fungi, the trees continue to languish and die in many towns and cities, points to a more important



THE CATALPA IN BLOOM

Largely used for ornamental purposes on lawns and in parks because of its fragrance, showy flowers and heavy foliage.

phase of tree protection. I refer to the frequent lack of municipal regulation in the planting and care of street trees, the careless attitude of the public, which is really most directly concerned, and the insufficient authority and working funds delegated to city foresters.

It would be a great injustice to say that all cities are negligent in their care and appreciation of shade trees, because many cities are keenly alive to the importance of the subject. A large number of cities now have trained men to look after the planting and care of their trees. Too often these men are underpaid and as a result poorly trained for the work and not active personally in local affairs pertaining to civic improvements. Too often they are limited in funds to such an extent that important work cannot be done at the right time. Civic organizations

of every city should interest themselves more in the matter of shade tree improvements to be obtained by trained and well-paid men. It is an investment for the future which no city will ever regret, and its results are almost immediately evident in the improved appearance of the trees and the systematic planting of the right kinds of trees along new streets.

I believe that we should be optimistic enough to expect that results will speak for themselves, and that every city will rapidly come to realize the importance of placing its planting plans and care of trees in the hands of a competent and well-trained forester, giving him funds and authority, not merely to give advice, but to accomplish results, which, measured by beauty, will have a value in the future unrivalled by any other form of civic improvement.

THE California lumber manufacturers have taken up the campaign for food production on their available land and Secretary E. A. Blocklinger, of the White and Sugar Pine Manufacturers, has sent out a detailed letter urging the production of food as a patriotic duty and opportunity.

A TREE forester and landscape engineer are desired by the city of Trenton, N. J., and applications blank for the places should be in not later than August 3. All information regarding the requirements may be had from the Civil Service Commission, Trenton, N. J.

THE WRENS

(Family Troglodytidae)

BY A. A. ALLEN, PH. D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

AGES ago there dwelt in northern Africa and along the Red Sea certain tribes of men known as the Troglodytes. They were herdsmen, living entirely upon flesh, and they made their homes in caverns which the ancient sea had gnawed into the rocks. They were hole-dwellers. This alone could have prompted the name of *Troglodytidae* for the great family of wrens, for surely there is no other comparison between these prehistoric, carnivorous shepherds and the little energetic brown birds which compose the wren family. But *Troglodytidae* they were christened, because of their hole-nesting habits, and by that name shall they always be known.

There are about 260 different kinds of wrens, the majority being found in the tropics of South and Central America. Between thirty and forty are found in the Old World and only fourteen in the United States and Canada.



PETULANT, INQUISITIVE, MISCHIEVOUS—BUT A GOOD FRIEND
JUST THE SAME

The house wren—the commonest and most widespread of all the wrens—is fond of human habitations and quick to avail himself of nesting boxes or crannies about the porch.

In spite of their numbers, they are remarkably uniform in plumage, wearing browns and grays in very inconspicuous patterns. They are, with few exceptions, very small birds, seldom exceeding five or six inches in length, with rounded wings and short tails, which they characteristically hold erect or even tilt forward over the back. Their small, plump, brown bodies and their habit of haunting brush piles or sneaking along the ground

give them an exceedingly mouse-like appearance. In fact, were it not for their inquisitive ways and their petulant voices, wrens would seldom be seen; but as it is, one cannot pass their retreats without being surveyed



GUARDING THE MARSHES

Short-billed marsh wrens would seldom be seen if they were content to creep around the tangled sedges, as is their usual habit—but at anyone's approach they climb the tallest reed in the vicinity and rebuke him for venturing into the marsh.

from every side and without being the target for their loud, fretful calls.

When not alarmed, the male seeks some exposed perch, where, with drooping tail, he gives vent to his exuberance in a voice of surprising volume and sweetness, for, with the exception of the cactus wrens, the whole wren family is famous for the brilliancy of its songs. Even the familiar loud, bubbling, gurgling song of the house wren sinks into insignificance when compared with the bold, ringing songs of the Carolina and canyon wrens or the roundelay of the winter wren. As with most birds, the song is usually confined to the male, but certain tropical species have the delightful habit of singing in duet. L. A. Fuertes, the well-known bird artist, in some pleasing essays entitled "Impressions of the Voices of Tropical Birds," gives us a vivid picture of these birds in action:

"This counter-singing by the female, so far as I am aware, is not generally known among birds, but it is cer-

tainly practised by this species (*Helcodytes bicolor*), as well as by all forms I know of, *Phenopodius*, *Henicorhina*, and *Donacobius*. In all these cases the birds sit close together, the male a little above the female, and his song is usually louder and more brilliant than hers. *Helcodytes bicolor* gurgles a loud, clear, oriole-like 'Keep your feet wet.' The female, three inches below and a little to one side, parallels this advice with an evenly timed 'What d'you care?' in perfect unison usually with the reiterated phrases of her mate. *Donacobius* does it somewhat differently, as the female only says 'wank, wank, wank,' while the male sits just above and sings almost exactly like a cardinal, or a boy whistling loudly to his dog, 'hui, hui, hui.' If the male gives only three phrases, so with the female; if, however, the male repeats his whistle a dozen times, the female begins and ends in exact time with him."

As suggested in the first paragraph, the nests of most wrens are placed in holes, either in hollow limbs, in crev-



A HOME DESPOILED

A humble bee has here utilized the nest of a marsh wren instead of that of a meadow mouse, as is his custom. A broken eggshell tells of the former occupant—a cell of honey possibilities for the future. The bee constructed an inner roof over the chamber containing the honey cell.

ices in the rocks, in cran- nies about buildings, or in nesting boxes erected for them. Some species, however, like the marsh wrens, build globular structures suspended in the reeds of the marshes, while the cactus wren makes an enormous structure of thorny twigs, placing it well within the heart of a Spanish bayonet or branching cactus.

The energy and industry of wrens find expression for itself in the building of duplicate nests. Not content with having completed one nest, many species, if not all, continue to carry material until half a dozen nests may be constructed. If they are hole-nesting species, every cranny in the vicinity will be stuffed full of sticks. If they are marsh wrens, they will place their globular structures usually within a

short radius, although in late summer and early fall, with their energy not yet failing even after rearing two broods of young, they may scatter their nests wherever the spirit seems to move them. The reason for building these duplicate nests, as suggested in AMERICAN FORESTRY for December, 1916, probably had its origin in the effort of the male to secure more than one mate, and indicates that the



A MARSH WREN AT ITS NEST

A long-billed marsh wren at its globular nest hung in the cat-tails of the marsh. The opening is in one side.



THE BEAUTIFUL LITTLE SHORT-BILLED MARSH WREN

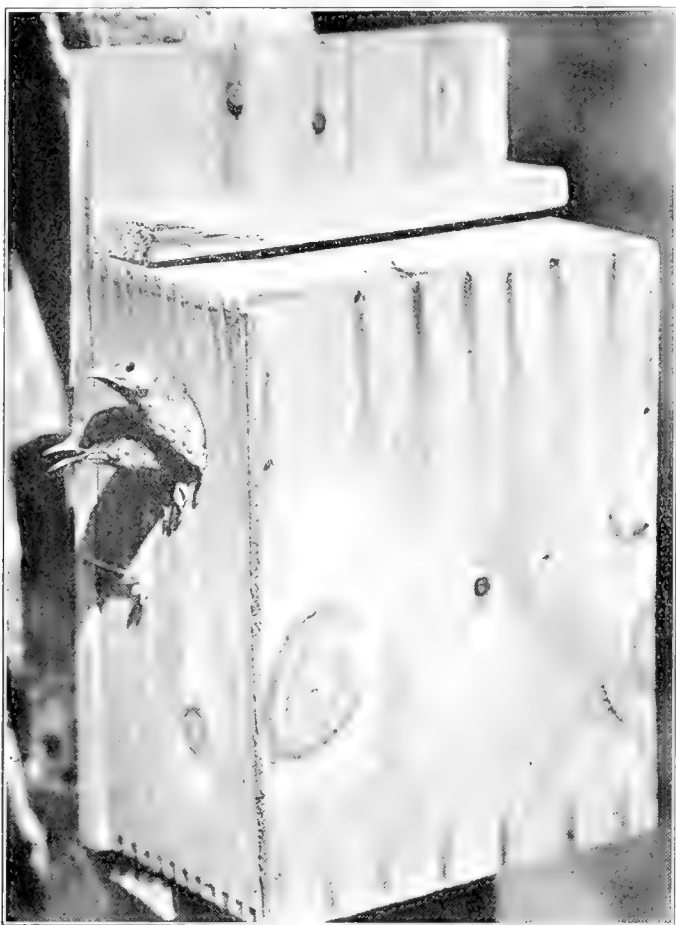
The bird at its nest in the sedges. This species does not frequent the deep-water marshes, but prefers the sedgy borders or even wet meadows.

wren progenitors were normally polygamous. That house wrens, and possibly others, still are polygamous when opportunity affords we now have considerable proof (*Ibid.*).

The irrepressible energy of the wrens likewise shows itself in the size of their families, for the eggs usually number six to eight instead of the three or four of most birds. They vary in color, with the different species, from the pure white ones of the short-billed marsh wren to those of the long-billed species which are so thickly speckled as to appear almost brown.

Wrens are almost entirely insectivorous birds, showing but little selection in the "bugs" they eat so long as they are sufficiently abundant to satisfy their insatiable appetites and those of their numerous young. How plen-

tinged blackbird's nest and deliberately peck holes in the eggs. I have found the eggs of Virginia and Sora rails with similar holes punched in them, and Dr. Chapman, in his charming book, "Bird Studies with a Camera," tells of watching a marsh wren, in a similar way, destroying the eggs of a least bittern. The familiar little



CHIPS FROM THE OLD BLOCK

Impatient and fretful—young wrens insist on being fed over 500 times a day, and one case is on record of a family which was fed 1217 times in one day.

tiful insects must be in order to maintain a wren family and how many pests are destroyed by these birds, one is better able to judge after watching the parent birds feed their young. It is by no means exceptional for them to feed their young from 500 to 700 times a day, while one instance is on record (see *The Auk*, January, 1917) of a single male wren (the female having been killed) which fed its young 1217 times during the fifteen hours and forty-five minutes of daylight.

There is but one blot on the name of the wren family: they are exceedingly mischievous. This sometimes results in disaster to their neighbors. I have seen a long-billed marsh wren, for example, perch on the edge of a red-



GETTING READY FOR SUMMER

Much skill and ingenuity are often required to get some of the larger sticks into the box, yet the house wrens persist in using just such materials.

house wren, likewise, sometimes indulges this egg-destroying habit. I once watched a male house wren go from the box where he was nesting to one occupied by a house sparrow, disappear for a moment, and then come out with a sparrow's egg in his bill. This he dropped and watched it fall until it broke on a porch roof below. He then dodged back into the nest and repeated the performance until all five eggs lay in fragments, when he flew to the nearest branch and burst into a triumphant song.

If the wrens practised this habit on house sparrows alone, we could only praise them, but, unfortunately, almost any other birds, particularly hole-nesting species, nesting in the near vicinity are likely to be treated in the same way. It is almost useless to try to attract other birds or to put up bird houses within fifty feet of a box occupied by wrens. Wrens and bluebirds seem bitterest enemies, and where they do nest fairly close together the bluebird is ever on the alert to chase the wren.

The *house wren* is the commonest and most widely distributed of all the wrens, some form of it being found throughout North and South America from Quebec to Argentina. It is uniform dark brown above, faintly

barred with black, and brownish gray below. It is smaller than the Carolina wren, which is more rufous and has a light line over its eye; it is larger than the winter wren, which is more heavily barred and has much darker underparts, but it is very similar to the Bewick's wren. This bird, however, has a light line over its eye, as has the Carolina wren, and light spots on the corners

lap except in the Alleghenies, for the winter wren is a Canadian species, while the Carolina wren is a southern bird occurring only occasionally as far north as New York and New England. In the fall, however, the winter wren migrates southward, some as far as Texas and northern Florida, and at this season all four kinds, as well as the two species of marsh wrens, may be found in the Southern States.

The *long-billed marsh wren* is the commoner of the two latter, frequenting the cat-tails and sedges of marshes bordering lakes, creeks, or sloughs, where its incessant song is always heard. Even during the hours of darkness, when most birds are quiet, the marshes will often resound with a chorus of marsh wrens. At such times it sounds as if Dame Nature were keeping late hours and had brought out innumerable tiny, ill-working



THE DUMMY NEST—A PECULIARITY OF THE WREN

A dummy nest of a long-billed marsh wren. All of the wrens build duplicate nests—possibly an indication of a former polygamous habit.

of its tail. So similar are all wrens to one another in size and color that it is much easier to identify them by their songs, which are distinctly different.

Both the house wren and the Bewick wren are fond of the habitations of mankind and are quick to avail themselves of nesting boxes put up for them, the house wren from Quebec to Virginia, the Bewick's wren from central Pennsylvania to South Carolina. They can be attracted even to the heart of large cities more successfully than any other birds because the opening in the nesting box need not be larger than an inch in diameter, and this will not admit sparrows or starlings, which, by usurping all available nesting sites, have done so much toward driving the hole-nesting species away from the cities. It is best to place the boxes on poles in the sun or light shade, although the wrens are not so particular in this respect as the other "nesting-box birds," and will take with equal readiness a box on the porch or in the centre of a tree.

The *winter wren* and the *Carolina wren* are both woodland species, but their breeding ranges do not over-



EGGS OF THE LONG-BILLED MARSH WREN

A section of a long-billed marsh wren's nest, showing the heavily spotted eggs. Those of the short-billed species are pure white and other species show all gradations in between.

sewing machines. Often the wrens seem to be carried away by the exuberance of their song, and, springing from the flags, they seem actually to explode upward. With their feathers shaken out, their short wings vibrating, their cocky tails tilted far forward over their plump little bodies, they look like animated cotton bolls.

The *short-billed marsh wren* is much yellower in general appearance than his dark, long-billed brother, and is seldom found in the deep-water marshes, for it prefers the sedgy borders of such or even wet meadows. It is ordinarily very mouse-like in its habits, running about among the tangled sedges, and would seldom be seen were it not for the fact that whenever any one approaches it climbs at once the highest reed in the vicinity to scold him for venturing so far from sidewalks and pavements. Its song is little more than a repetition of its call, like the

sound produced by striking two pebbles rapidly together, ending with more of a grating sound.

In the arid regions of the West dwells the largest and most unwren-like of all the wrens, the *cactus wren*. It is a gray bird with a white spotted breast whose large, retort-shaped nests are one of the most characteristic sights of the cactus country. Its song is the least musical of any member of the family, although it is given in characteristic wren fashion, with the tail drooping and the head thrown back.

In the dry, rock-bound regions of the West, where most bird life is scarce, lives the *rock wren*, whose curious tinkling song is one of the few redeeming

features of the desolate rock slides of the mountains.

In the canyons it is the song of the *canyon wren* that so frequently causes the rocks to reverberate with wild ringing notes. The bugler, it is sometimes called, but a tiny bugler indeed, less than six inches in length and so inconspicuous that were it not for its white throat it would escape unseen.

The *Parkman wren* and the *Vigors wren* of the Pacific coast region are the western representatives of the eastern house wren and the Bewick's wren. The common wren of Europe and the British Islands, or Jenny wren, as it is often called, is a species very similar to our winter wren in color, song, and habits.

THE DEADLY MANZANILLO

BY FRANK COYNE

LITERATURE on the tropics abounds with stories of poisonous plants and trees, and to this beautiful tree, arching many a roadway with its glossy green leaves and rose-tinted flowers, has been ascribed

tree have, however, been greatly exaggerated, and as for the actual poisonous effect of the leaves and shade considerable diversity of opinion still exists, as is the case with the poison ivy of the States.

The small, apple-shaped fruits have tempted many a stranger to a much-regretted meal. As recently as the summer of 1916 an officer of a Dutch steamer had a narrow escape from serious poisoning, emetics and stomach pumps alone saving his life. Some 32 years ago 54 members of the crew of a German ship were taken to the local hospital, all very sick from having eaten the fruit of the Manzanillo. Five of this number died and the rest after serious illness for several weeks recovered.

As is the case with the question of the leaves and shade, there are many accounts of the effect of the fruit. To quote from one writer, "A fish which eats the fruit becomes infected, the gills becoming yellow and black, and one who eats the fish in this state is said to fall into a profound lethargy, with a general relaxation of all the limbs, according to the amount eaten."

The tree when cut exudes a quantity of white, milky juice, in the same manner as the common rubber-tree, and to most persons this juice has the same effect as our poison-ivy. However, if this acrid milky juice reaches the delicate membranes of the eye temporary and often permanent blindness is sure to follow.

The Manzanillo is a native of the West Indian Islands and is usually found in moist situations. The accompanying picture shows a pure stand of the Manzanillo, fringing the banks of a small stream on the Island of Curaçao.



MANZANILLO GROVE, CURACAO, DUTCH WEST INDIES

This beautiful little grove belies the deadly reputation which tradition has attached to the manzanillo—that he who partakes of the fruit, or sleeps under the trees, is likely to sleep forever.

the deadly poisonous properties of the far-famed Upas tree of the East.

To the fruit of this tree, more than to the effect of its foliage, is due its evil name. Manzanillo in Spanish means "little apple," and in the Papiamento tongue of the blacks of Curaçao, Dutch West Indies, living in their little thatched huts, the name Manzanillo is pronounced but slightly differently from the Spanish.

It has been stated by Spanish writers that if one remains under its shade for a few hours or sleeps there death is likely to follow, or that even if the unfortunate escapes death the body will become a mass of running sores. The deleterious properties of the shade of this

IN response to an inquiry from the National Wool Growers' Association, the Forest Service announced that stock growers having National Forest grazing preferences will be permitted, if they enlist in the army or navy, to retain their preferences without use of the range during the period of enlistment. Those wishing to avail themselves of this privilege will file a statement similar to that now required of State and Federal employees who wish to discontinue use of the range during their term of service without losing their preferences.

WINDOW GARDEN ATTRACTIONS

By C. W. H. DOUGLASS

THE window box, as a means of relieving and beautifying the stern face of the modern office building, is becoming more and more popular as people realize that not only is it an inspiration and pleasure, but also has a practical value. Numerous observations have shown that the use of plants in this way makes an excellent advertisement, and the effect upon employees within whose range of vision the plants are placed is wholesome and conducive to better work.

Developing a system of parks, beautify-



Courtesy of the Missouri Botanical Garden.

AN INFORMAL ARRANGEMENT OF FLOWERS IN A BARK-COVERED BOX

This window box, covered with bark and filled with Boston fern, anthericum, boxwood, rubber plant, vinca major, Kew palm, geranium and hibiscus, makes a very attractive window garden.

tal trees or shrubs at the entrances and the window boxes.

Because the windows far outnumber the entrances, the window box is the more important of the two. At the same time it offers a much greater opportunity for variety in decoration. It may be a riot of color or a dignified and unobtrusive bit of decoration. And with the changes of season an endless variety of plants may be used in their most beautiful stages of development and bloom.

Good taste must of course be exercised in selecting the type and size of box to be used. Boxes made of wood are most popular because of their light weight and relative cheapness as compared with those made of concrete, terra cotta, or vitrified clay. Cypress, redwood, cedar, chestnut,

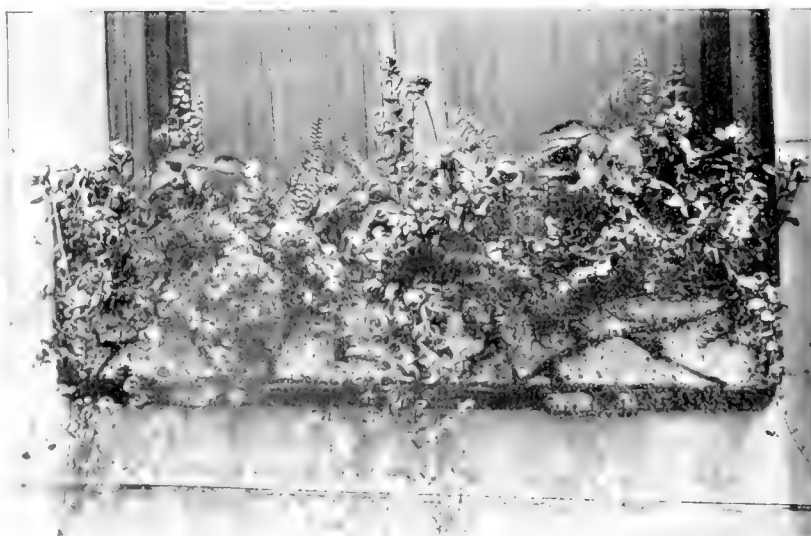


Courtesy of the Missouri Botanical Garden.

A MORE FORMAL ARRANGEMENT, IN A BOX WITH SEVERER LINES

This box is arranged to give a slightly more formal effect than that above. The plants are pandanus verticillatus, caladium, canna, English ivy and vinca major.

ing the grounds in close proximity to public buildings, encouraging the decoration of the home grounds, and adding a touch of softening decoration to the buildings in the business section are all factors in the problem of beautifying a city. The last one is the least developed, due no doubt to a lack of proper appreciation of the results that can be attained as well as to the inherent difficulties presented by this type of building. There is no possibility, except in rare cases, of planting trees to grace the view because of lack of space. Likewise, the use of shrubbery is impossible, and climbing vines, which have such a softening effect, have no place to take root. The only means remaining for decorating the office building are the tubbed ornamen-



Courtesy of the Missouri Botanical Garden.

AN ARTISTIC GROUPING IN A BOX COVERED WITH BIRCH BARK

Vinca major, asparagus sprengeri, petunia, vinca rosea, coleus and Boston fern in a window box made of wood and covered with birch bark. This gives a good idea of the effect obtained by placing the plants close together in the box.



Courtesy of the Missouri Botanical Garden.

A BEAUTIFUL PLANTING IN A METAL WINDOW BOX

A metal box containing hibiscus, crotons, vinca major, dracæna terminalis and pandanus veitchii. The trailing vines help to soften the hard, abruptly-angled lines of the building, yet not so profuse as to give a "weepy" effect.

and several other woods are durable in contact with air or soil, and a box made of any one of them, thoroughly painted both inside and outside, will last a long time. Bark of the birch, hemlock, or cedar may be used with very good effect to cover the box. The depth of the receptacle should be at least six inches, and better results will be obtained if it is eight to ten inches deep. The width of the window ledge determines the width of the box, although from six to nine inches is considered best. Length is entirely dependent on convenience of handling. If the ledges are long, it is easier to handle the boxes if they are made up in short sections. Most ledges are built with an outward and downward slope, which makes it necessary to put strips under the outside edges of the box to keep

it level. It should also be anchored to the building by wires running to the window sills, or some other means, which will prevent it from slipping gradually or being blown off in a storm. Boxes in upper-story windows should be equipped with drip-pans to prevent leakage of water and consequent staining of the building by the minerals dissolved in the water during its passage through the earth in the box.

For the best growth of the plants a fibrous loam soil is best. Too much clay or too much sand will be detrimental.

The soil will need enriching, and for this purpose thoroughly rotted stable manure is best. It should be dried and crumbled into powder and then mixed with the soil in the proportion of one part of manure



Courtesy of the Missouri Botanical Garden.

A MOST EFFECTIVE WINDOW GARDEN

This beautiful window garden makes a very attractive decoration for the high-class apartment hotel. The English ivy, completely covering the box, makes a background against which the flowers of the geranium show to best advantage. The date palms add a desirable touch of formality.

to from two to six parts of soil. This fining of the manure by drying and powdering, and thoroughly mixing with the soil, is considered very important in securing the most luxurious plant growth.

The drainage of the box is very important, although it will be more likely to suffer because of too little moisture rather than too much; nevertheless, if no means is provided for getting rid of surplus water, except evaporation, the plants will suffer. The bottom of the box should be perforated with a number of half-inch holes about six inches apart, and these partly covered with pieces of crock placed curved side up. Some people get best results by filling the box an inch or an inch and a half deep with pieces of broken crock, then throwing the soil in on top, taking care not to pack it.

The success or failure of the box very often depends on the watering or lack of it.



Courtesy of the Missouri Botanical Garden.

ANOTHER PLAN FOR A WINDOW GARDEN

The architecture of this building prevents the use of a long window box. Hydrangeas and English ivy here combine splendidly in an attractive bit of decoration, using the short but comparatively deep space available to the best advantage.

The frequency of watering can only be determined by actual practice, being dependent on atmospheric conditions, soil, sunlight, wind, etc. During average summer weather the plants should be watered once a day, and this should be done after sunset if possible to prevent scalding of the plants. The foliage should be washed in the process of watering to keep the leaves clear of dust, which clogs the air pores, to the detriment of the plants.

The red spider and the green aphids are the chief insect enemies that are liable to attack plants. A thorough syringing of the foliage on both sides will eliminate the red spider, and spraying with a tobacco solution eradicates the aphids.

In selecting the plants to be used in the window boxes, special attention must be given to the amount of sunshine they receive. All plants require plenty of light, but some make lesser demands for it than others. Plants which do not demand the maximum amount can be used on the north side of buildings or in shaded situations. It is easy to overdo the use of certain conspicuous plants of trailing habit, which give an undesirable "weepy" effect, due to the great profusion of hanging vines. Color combinations are important, of course, and the colors of blossoms must be considered in selecting the plants. Against light stone or stucco, red, purple, or scarlet will look well, and blues, yellows, and whites with as much green as possible as a background make a pretty contrast with the red brick building. Flowering plants should possess the qualities of rapid development and profuse-

ness and continuity of bloom. The succession of bloom may be carried out by filling the boxes in the spring with pansies and English daisies, and following these with foliage and flowering plants lasting throughout the summer.

The following varieties of annual flowering plants

are specially suitable for window gardens: *Ageratum*, a compact-growing, hardy plant, about one foot in height and producing a constant succession of white, light blue, or purple flowers; *Asters*, although more easily grown in the open ground than in boxes, and having a short season of bloom, will thrive in the window garden; *Calceola*, a slender, graceful plant, blooming persistently, growing about sixteen inches high and bearing tassel-shaped, bright orange-colored flowers; *Calendula* or *Marigold*, a rather coarse plant from ten to fourteen inches tall and producing large yellow flowers; *Candytuft*, a hardy, easily grown plant six to sixteen inches high and bearing abundant clusters of white or purple



Courtesy of the Missouri Botanical Garden.

EFFECTIVE ARRANGEMENT FOR AN ENTRANCE

The fresh, rich green of the English ivy and geraniums in the boxes, and the bay tree in the tub, makes an attractive contrast with hot pavements and the severe architectural design of the modern office building. The tired business man has a springier step and a keener light in his eye when working in such an atmosphere—such is the subtle, scarcely to be observed effect of nature's living plants.

flowers; *California poppy*, an open trailer and a persistent though not abundant bloomer; *Chinese pink*, a persistent bloomer with flowers of brilliant color; *Dianthus*, a brilliant-hued garden pink which is not easily grown, but is so attractive as to warrant the effort; *Cobelia*, a slender-stemmed, delicately graceful plant bearing small, beautiful blue flowers, and very desirable for the window box because of its graceful habit of growth and constant bloom; *Mignonette*, one of the most fragrant of our common flowers, and one that does well in the window box; *Nasturtium*, an excel-

lent plant for the window box, as its graceful habit of growth and brilliant flowers are very effective; no manure should be added to the soil for nasturtiums; Petunia, a plant which produces a succession of bright-colored, broad, trumpet-shaped flowers which give brilliancy to any collection; Snapdragon, a rather slow plant to bloom, but one that is attractive while growing and makes a good background for the other plants of the collection and is very brilliant and showy when it does bloom; Sweet Alyssum, a low-growing, spreading plant, with small, white, sweet-scented flowers, produced in abundance; Verbena, a trailer which covers two to six square feet and is an abundant and persistent bloomer; Zinnia, a strong, rather coarse-growing plant, but very hardy and a persistent bloomer.

There are many other plants which are suitable for window-box use. With any combination, certain foliage plants should be used to furnish a sufficient filler or background for the flowers. Among these asparagus, red and green dracena, English ivy, sword fern, Whitmani fern, pandanus, vinca, and wandering Jew are most adaptable.

The great range of available plants makes it impossible to indicate exactly what the arrangement and combinations should be, but the following examples are suggested:

SUNNY LOCATION

1. Vinca major—front.
Petunia—filler.
Ageratum—filler.
Vinca Rosea—points.
2. English ivy—front.
Asparagus Sprengeri—front.
Geranium—filler.
Lantana—filler.
Hibiscus—points.
3. Wandering Jew—front.
Asparagus Sprengeri—front.
Verbena—filler.
Petunia—filler.
Marigold—filler.
Croton—filler.

SHADY LOCATION

1. Asparagus Sprengeri—front.
Dracena terminalis—points.
Boston fern—filler.
2. English ivy—front.
Coleus—filler.
Boston fern—filler.
Pandanus Veitchii—points.
3. German ivy—front.
Asparagus Sprengeri—front.
Hibiscus—points.
Whitmani fern—filler.
Croton—filler.

A FORESTRY CONFERENCE

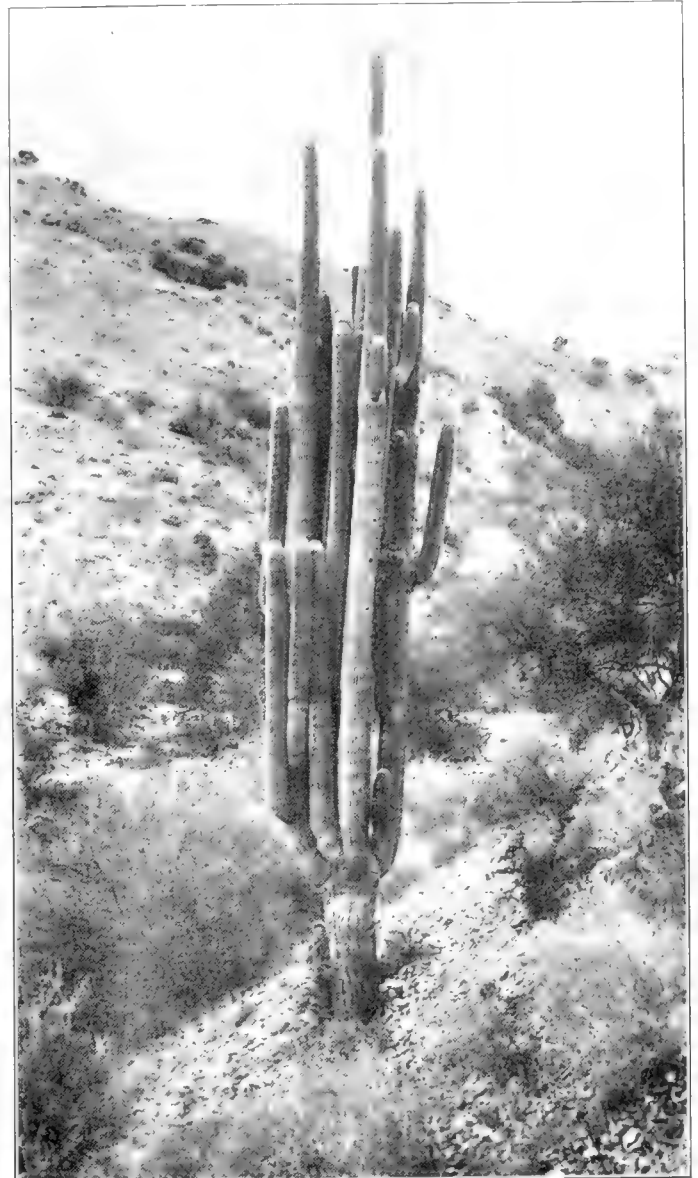
A FORESTRY conference held at Pittsburgh, June 21, 22 and 23, was well attended by members of the American Forestry Association, Pennsylvania State Forestry Association, Canadian Forestry Association and other organizations interested in forest conservation. Three full and profitable days were spent in hearing addresses, in viewing municipal plantings, nurseries and examining forested lands in various sections of the state near Pittsburgh. Dr. Henry S. Drinker, president of the Pennsylvania Forestry Association and a director of the American Forestry Association, presided at the sessions. Owing to illness Mr. Charles Lathrop Pack, president of the American Forestry Association and also president of the National Emergency Food Garden Commission, was unable to be present, but sent an address on food conservation to be read.

A GIANT CACTUS

By Stanley F. Wilson

THIS giant cactus (*Cercus giganteus*) was found at an elevation of 3600 feet twenty-five miles northeast of Tucson at the border of the Santa Catalina Division of the Coronado National Forest.

Its height is forty-five feet; its diameter breast-high, twenty-six inches. There are more than fifty branches.



ARIZONA'S GIANT CACTUS

This great plant, weighing five tons, is forty-five feet high and has a diameter of twenty-six inches.

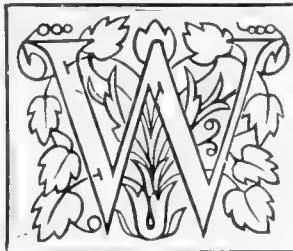
It is estimated that the weight of the plant is more than five tons. Its age is unknown, but must be very great. The dots are woodpecker holes. These birds delight in the giant cactus. It furnishes a fortified residence for birds of many species.

Most people see only the desert country in travelling through Arizona. This is because the railroads follow the lower levels. How many people would believe that on the summit of the Catalina Mountains, only nine miles from this cactus, are to be found giant firs and pines, Alpine wild flowers, a well-stocked trout stream, an ideal summer climate, and a rapidly growing summer colony where people take refuge from the heat of the desert?

Forestry for Boys and Girls

by Bristow Adams

SOME OF THE WOODSIDE FOODS



WE are all trying to do our bit in one way or another. Our best way seems to be in the food campaign. Mother tries wheatless meals on

us and we are even going a step further and eating dinners that are both meatless and wheatless. It is something of a game with us and we make jokes about it; but we have the grimmest sort of humor in the thought that war is not only making wheatless and meatless dinners but also in many parts of Europe is making "eatless" meals. Mother was much cast down over the first trial at a meal without wheat or meat when she served us macaroni and cheese and corn muffins. It was a special "company" dinner, with green peas, fruit salad, ice-cream and macaroons. Good enough for Mr. Hoover or anybody! But when our Lady of the Home realized that macaroni is made of wheat it 'most broke her heart. However, it was a start, and from that start we have had many another such meal, equally as good and without the wheat that the Allies need.

FEW of us know how much food the woods hold for us: Wild strawberries, blackberries, dewberries, raspberries, huckleberries. The so-called weeds are good; and there must have been a time when man first tried to eat rhubarb and asparagus. Lettuce is undoubtedly developed from a plant pretty close to the dandelion. We have eaten with relish the young shoots of the poke-berry, or "poke-root." Burdock, wild mustard, purslane and a lot of others are worth trying, though it is unwise to eat strange roots or plants with which one is not familiar. The deadly water-hemlock, or

cicuta, is not uncommon and it looks just as good to eat as many another herb.

For myself, I cannot raise any very great stir of enthusiasm for most of these "wild greens." One "mess" of dandelions will do me for a long time, and two are about all I can stand for each season. At least, that is the way I feel now; they say hunger may make a man do anything.

THERE is a lot of fun, as well as thrift, in going to the woods for berries, or rather to the pastures at the edge of the woods. A day in the blackberries is one of adventure. We are supposed to bring in our cups of berries as the cups are filled, mother being in charge of the central station, and of the lunch. Always there is a clamor for that lunch long before lunch time.

Toto comes in with a cup that is not very full and a wail that he is on the edge of starvation. Yet he is smeared from ear to ear with the rich juice of blackberries.

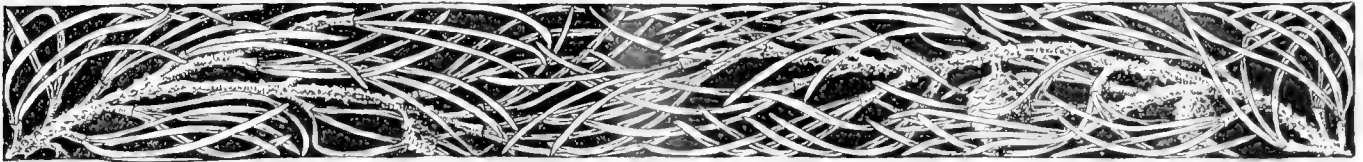
"I only ate one," he declares in reply to an accusing finger.

"That sounds like bad grammar," says father, butting in from the heights of great wisdom; "but it may be all right. He 'only ate one' and the rest were used for a facial massage."

Toto rolls his big eyes, as he always does, when puzzled.

"Maybe I did eat more than one," he admits, "but a fellow's got to do something when he's hungry and they won't give him anything to eat."

This appeal is too much. So the baskets are opened and the feast is spread; then a munching in silent contentment, and afterwards a rest in the shade with every one of us too full to move with comfort; afterwards more berry-picking; the finding of a song-sparrow's nest with young in it. When the little birds stretch their necks and open their mouths that look almost as big



as the nest itself, Toto wants to feed them each a ripe blackberry. We tell him that they much prefer the insects which the mother bird brings. We see her hovering near, and stand back to watch how she does it. Just as soon as they hear her come, up pop the heads and wide-open fly the mouths; in goes the bug and away flies the parent bird in the task that does not stop while daylight lasts. Everywhere the search for food, life's great need!

Trudging home toward supper-time as the day begins to grow cooler, we are tired but happy. Fresh berries and cream with bread and butter for the evening meal; early good-nights, and then comes wholesome rest. Next day appetizing odors of the cooking fruit, for jellies, for preserves, or for canned berries to go in next winter's pies. Mother takes us in to show her proud rows of neatly labeled jars.

OUT in the yard are trays of fruit and vegetables drying. This drying is worth more than most folks realize. It is so easy to do! An electric fan and some shallow trays make as good a drier as one could wish. Yet the fan is not necessary. The heat of the sun is enough, and is better than artificial heat, which makes the food lose color and flavor and even some of its food value.

Here are some of the things that our Home-maker has found out:

Strawberries and asparagus are no good dried; the strawberries make a pasty mush, and the asparagus goes into tough strings that furnish a good fiber but mighty little food.

All the small fruits, including rhubarb, can be dried with success. Raspberries, blackberries, loganberries, huckleberries seem to go away to a dry mass of seeds and skins, but they cook back to their original color, and flavor, and volume. Drying is a good method this year because it does not have to depend on a supply of cans.

Vegetables should be sliced before drying, and this is true, of course, of the larger fruits, such as apples or peaches. If there is no root-cellar or root-pit, potatoes, carrots, and turnips may be sliced and dried. Onions, string beans, lima

beans, peas, spinach, cauliflower, cabbage, Brussels sprouts and okra dry perfectly.

Sweet corn, white potatoes and sweet potatoes need to be cooked before drying, though the cooking does not have to be thorough. A short plunging into boiling water seems to be enough. If they are not cooked they lose their color and may not keep.

DRYING is not without its fun, even for the children. They like to see the orderly trays under their mosquito-nettings out in the sun. There is excitement in the scurry to get the trays under cover when a sudden summer shower comes. In spite of the mosquito-net, many insects that like sweets come to the drying trays, and Everett has added some rare kinds to his sets of butterflies.

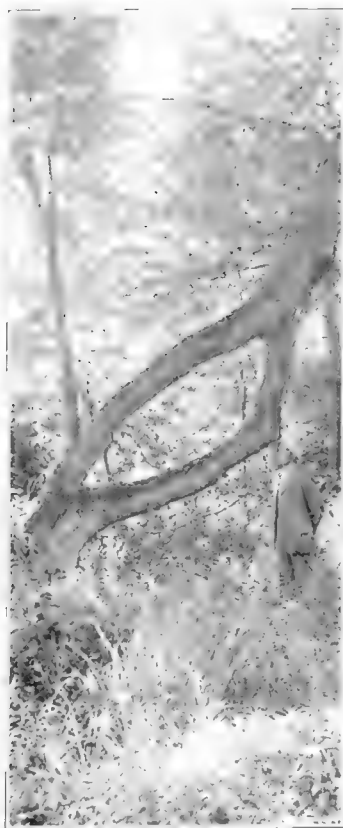
Once he had a trying result when his joking uncle told him that he could catch them easily if he could put salt on their tails. Everett has a most serious mind and an earnest nature. He got the big salt box out of the kitchen; then, when the butterflies were rather thickly gathered over the netting, he let fly with a broadcast deluge of salt that ought to have caught them all. Mother was riled for a time; but it was her own brother who was to blame, so we told them to fight it out in their own family, and they soon saw the joke, even though it was on them.

AS I said in the beginning, we have fun over the food situation. It is best that we should while we can; but in the meantime we must see its serious side. It is very serious for our friends across the water now; it is going to be serious for us. The best of it all is that each one can do his part—man, woman and child. In our own house we are eating less, and we are just as well as we were before, or even have better health. The plates that go to the kitchen go there empty. No more crusts and bits of food for the garbage can; no half-inch of milk left in the bottom of the glass.

"That would feed a Belgian kiddie!" cry all the other children if one of ours leaves a scrap of good food; and the morsel is eaten—or saved, by and for the same child—out of very shame.



SOME INTERESTING TREES OF SINGULAR GROWTH



NATURAL GRAFT OF BEECH



"SIAMESE TWIN" SYCAMORE



NATURAL AFFINITIES



GRAFT OF A BEAUTIFUL BEECH

THE first picture, of natural graft of beech, was sent to *AMERICAN FORESTRY* by Mr. J. G. Brown, and was taken by him during the summer of 1916 about a mile southeast of Palisade Park, a summer resort near South Haven, Michigan, in a grove of soft maples bordering an old oxbow of Brandywine Creek, while he was studying the physiographic ecology of the region in a class of the University of Chicago.

Near West Milford, in West Virginia, on the banks of the West Fork River, is found growing the remarkable specimen of sycamore which we have dubbed the "Siamese Twin." A close examination of the photograph will show that the trunks are joined at three different

points. The gentleman is standing on the middle connecting limb, or what might be called the "second floor."

There seems to be no reason for the white oaks in the next picture to have grown together—they just did.

The last photograph is another instance of natural graft of beech, and quite a striking example of peculiar growth. The tree started out to be a twin, and then changed its mind and grew together again, its health and beauty unimpaired by its freaky growth.

This photograph, and the ones of the sycamore and the white oaks, were all taken within a mile of each other, and were sent to *AMERICAN FORESTRY* by Mr. J. Franklin McConkey.

THE largest number of sheep grazed on any single National Forest is 315,740, finding pasturage on the Humboldt in Nevada, while the largest number of cattle—75,818 head—is found on the Tonto in Arizona. The value of the average annual meat product of these two National Forests is estimated at \$2,000,000.

OF the 22,000,000 trees planted on the Pennsylvania State Forests to January 1, 1917, over 15,000,000, or about seventy-two per cent., are now living, according to a

statement made by the Commissioner of Forestry. Figures are not available on the present status of the private plantations, but up to the end of 1916 about 3,000,000 seedlings were planted by corporations and individuals, and at least 2,000,000 should be in good condition now.

THE work of classifying and opening to homestead entry such lands in the National Forests as are chiefly valuable for agriculture is progressing rapidly. More than seventy million acres have been covered by field examinations and the final reports acted upon.

PAPER-MAKING IN THE INSECT WORLD

BY DR. R. W. SHUFELDT, C.M.Z.S.

A MOST interesting volume might be written devoted exclusively to the achievements of many insects in the arts and trades, and the treatise would, in the matter of size, by no means be a booklet. When I say this, I do not refer to such structures as the cocoons spun by many caterpillars and the like; for the material used in their construction—that is the silk—is secreted by a special organ forming a part of the economy

Wonderful as many of these are, none are more so or more interesting than the various forms of paper nests constructed by certain species of hornets and wasps. Some of them are familiar to us as occurring in the insect fauna of the Atlantic seaboard states, and to these the present article will be confined, though there is a great temptation to refer to other examples found in various parts of the world, which are most extraordinary with respect to their nesting-habits.

We are all familiar with the common brown wasp, for there is hardly one who has not, at one time or another, been stung by one of them. It is the female of this species that constructs the paper nest, which contains the young wasps until the time has arrived for them to fly. When they are ready to build, they resort to places where they can find fibres of old wood; this they gnaw and knead until a grayish mass is manufactured which closely resembles *papier-maché* in color, consistency, and other properties. While this mass is being prepared, its adhesive quality is



THE NEST MOST OFTEN SEEN

FIG. 1.—Here we have several wasps of the common species in the eastern part of the United States, resting upon a small paper nest they have completed, in the cells of which the eggs of the insect have been deposited. The back of this nest, that is, the opposite side of the view given in the cut, is made fast to the twig of the bush selected by the builders by means of a strong little pedicle, made of the same material as the nest, only denser and darker. This is the only paper now being made in this country not costing more for production, claimed by the manufacturers, and not affected by the war in Europe.

of the animal. But, upon the other hand, the instances in the book could be confined to the work of such a remarkable insect mechanic as the carpenter bee—a species that cuts a tunnel for its home in solid wood, the entrance to which is almost a true circle half an inch in diameter, and the rest a tube several inches in length, of about the same diameter and quite cylindrical. With a brace and bit one can make a similar excavation; but should the tunnel made by the bee alter its direction, even for the eighth of an inch or less—as happens in some species—there is no tool that can accomplish what this insect does in its particular piece of carpentry. Then there are the remarkable cells of the mud-wasps, which one would have considerable difficulty in imitating with accuracy, to say nothing of the wax-combs of the honey bee, and an almost endless number of other structures made by representatives of various orders of the insect world.



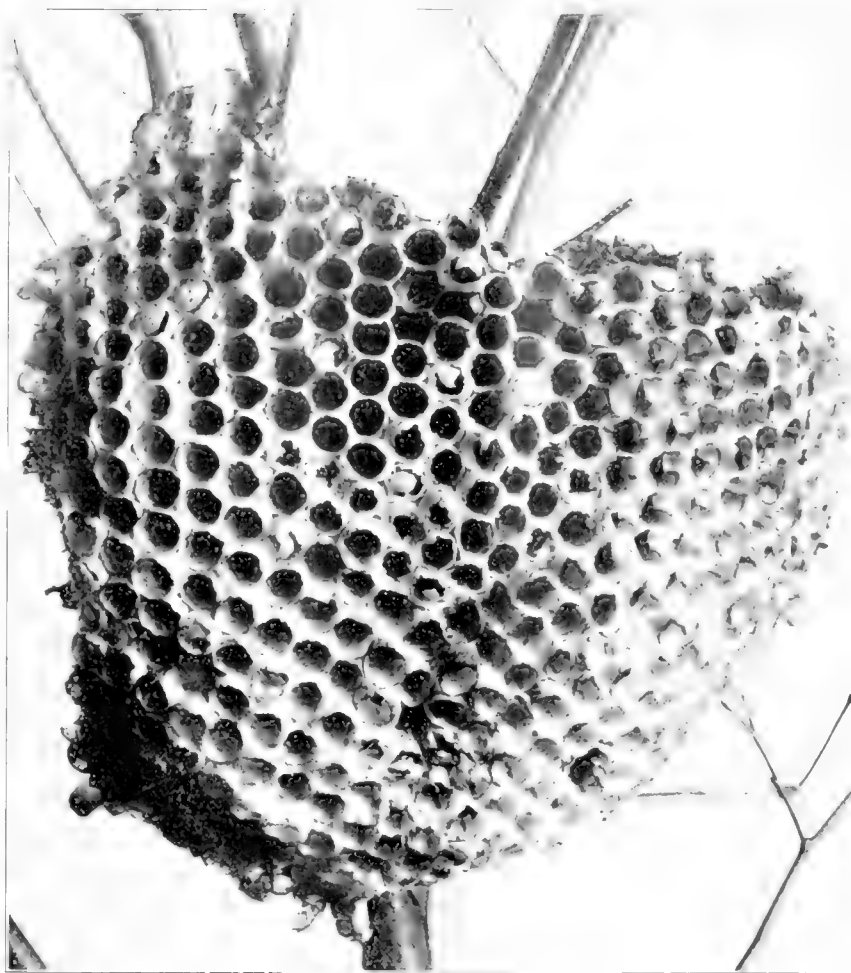
THE NEST OF THE BLACK HORNET

FIG. 2.—The nest shown in this illustration is made by the common black hornet of the Atlantic States; it is more or less fully described in the text of this article. These nests, or nests of this form, are often of great size—in fact, big enough to fill a bushel basket, or even larger. They contain a series, or tier, of nests, quite similar to the ones shown in Fig. 1, only of greater size with respect to the diameter. Eventually, this series of nests, fastened together by a central pedicle in horizontal planes, is completely surrounded or housed in by a top-shaped structure, similar to the one shown in the illustration. These insects, upon being disturbed, fiercely resent it, and frequently their combined attacks are quite

ensured by there being incorporated into it the secretion of the salivary glands of the insect.

It is with this material that the common brown wasp builds such a nest as shown in Figure 1. I photographed this specimen in the woods near Cabin John Bridge in Maryland, a few miles from Washington. Only three or four wasps were the proprietors here, and this structure was selected because it was small and showed so well the hexagonal paper cells for the young. Moreover, the nest was in a vertical position, which is by no means usual; as a rule they lie in the horizontal plane when finished. Along the old Georgetown Canal I saw recently, far up in a dogwood tree, one of the largest—indeed the very largest—specimen of the paper wasps' nest that I had ever seen. It certainly was a foot and a half in diameter, and covered with a very large colony of the insects. At this time they were busy depositing the single egg the female lays at the bottom of each cell. Then the aperture of each is sealed over with a paper, which I have always noticed is some four or five shades paler than that of which the nest is made. Several attempts to collect this fine specimen were failures, as the wasps were then in a very combative frame of mind. It is firmly attached to the twigs by its usual single, strong pedicle, far up in the top of the tree. Unlike the nest shown in Figure 1, it is tipped at an angle of forty-five degrees. In New England these brown wasps often build in the stone walls surrounding farm fields, or under fence-rails, and elsewhere.

The form of the nest is more or less circular in outline, though I have collected those which were oval, or even a bit triangular or oblong in shape. I have never met with one in which the openings of the cells faced upwards; if they were so built, the rain might get into the cells, and



A TYPICAL WASPS' NEST

FIG. 3.—Another species of these brown wasps build a large nest, of a form shown in this cut; they are abundant in many sections of the Middle Atlantic States, but are not usually seen until the leaves are all off the trees in early winter, at which time both young and old have all departed. In form, they are roughly circular or subcircular in outline; unhoused, and made up of a large number of cylindrical paper tubes, closely packed together and united in such a manner as to successfully resist tearing apart. This nest in its posterior aspect, which is concave, is united to a twig or shrub by a single, tough, paper pedicle, usually situated above the middle of the nest. This cut is a reduced reproduction of one of these structures which I photographed natural size, having collected it on the 5th of December, 1916, in southern Maryland. It was in a tree about thirty feet above the ground; it measured about 6×6 inches, and was made of over two hundred cells. Sometimes these nests are built in the tallest trees in the forest, and sometimes in a vine or shrub not five feet above the ground. Occasionally we find two or more in the same tree.

destroy the young as well as the nest.

A far more elaborate nest than the one just described is constructed by the paper hornet, an insect also very abundant in the eastern United States; these are frequently large enough to fill a bushel basket. Such a nest is shown in Figure 2, and I have cut out with a knife the near side of it, in order to expose the three tiers of nests inside, each of which is built precisely as the brown wasps build theirs. They are arranged one above the other, the whole having a paper structure built around it, usually top-shaped in outline, with a hole below and to one side, for the insects to go in and out of as occasion requires. This species

often construct their nests under the eaves of various buildings, in the country or well within the city limits. In the forests they build in trees or shrubs, sometimes so close to the ground as to be in contact with it, while at other times as high up as fifty feet or more. The smallest nest of this hornet that I ever met with was no bigger than a boy's peg-top.

All of these paper nests, of both hornets and wasps, are composed of the same material, and constructed in the same manner. The paper, being manufactured from wood pulp, is quite durable, tough, and strong. If a nest be kept in a dry place indoors, it will last for ages and exhibit no sign of breaking down; one that I collected many years ago is still on the shelf of one of my bookcases. Brown wasps built that one; and the most interesting feature it presents is that it is a half circle in form, the cells on the long diameter being the deepest and largest, while those around the periphery are so very small and shallow as to be entirely useless, beyond finishing off the marginal curvature of the structure. Quite a few other insects also construct interesting forms of paper nests.

PINE BLISTER DISEASE WORK PROGRESSES

THE organization of the campaign against the white pine blister disease has gone forward steadily.

Many of the state appropriations were delayed six weeks or two months beyond their ordinary course on account of the pressure of National Defence measures. Fortunately the season was much later than normally is the case. A few fruiting pine specimens were found early in May, but it was the middle of May before the pines in the heavily infected localities of New England showed an abundance of blisters. The first stage of the disease on currants and gooseberries was discovered on June 5, the same date on which it appeared last season. The second stage of the currant rust was found on June 13, ten days earlier than last year.

The results of scouting to date have shown conditions to be just what was feared last year as a result of the wide distribution of the blister disease on currants and gooseberries throughout New England. At all of the points where diseased native pines existed last year the disease was found to make steady progress. For instance, one tree in the Kittery Point infection area, 38 feet high, was being girdled on the main stem at a point 20 feet above ground where the circumference of the trunk was 23 inches. All of the side branches on this tree—more than 100—were infected with the blister rust, as the bright colored blisters plainly proved. In addition to the increased size of the infection areas at Kittery Point, Swansea, Massachusetts; Stratham, New Hampshire; Lyndonville and Woodstock, Vermont; Essex County, New York, and Norfolk, Connecticut, many new areas of infected pines, both planted and native, were found in these states. One of the most serious is at Intervale, New Hampshire, near the Cathedral Pines. On a pine hedge near the Cathedral Pines, 1021 infected branches were removed and about 90 infections taken from a single tree. On another property where there were a dozen heavily infected black currant bushes in a garden there were a number of infected pine trees about 40 feet distant. One of these trees, 6 feet high, had 26 separate blister rust infections and showed indications that many more infected branches were developing. Infected pines were found on other nearby properties and the pines of the whole region are apparently in the greatest immediate danger if not already hopelessly diseased.

Currants and gooseberries, both wild and cultivated, at this early date, are already heavily infected in regions where pine infection is plentiful. Currants and gooseberries in Maine are about as heavily infected now as they were last year in August and September. Between Brunswick and Bath, Maine, they are generally infected; that is, careful observation shows that it is safe to estimate that 90 per cent of all these plants are infected now. Many plants already have infection on practically every leaf. This condition existing so early in the season (the latter part of June) indicates that these plants must have been directly exposed to spores from pines. Infection is especially heavy on skunk currants.

Pine infection is well scattered between Brunswick and Bath. At Bath there exists a comparatively large area which contains at least 90 per cent of infected white pine trees. Many of these have fruited during the past season. On one young tree 35 infected branches were noted. The oldest infection found in the Bath area appears to have taken place about eight years ago, probably less.

The wild currant and gooseberry bushes along one side of the highway between the villages of Warren and Wentworth, Grafton County, New Hampshire, were examined; 91 per cent of the plants proved to be infected. In New York State pine infections were found scattered over a number of square miles of fine native pine growth in Essex County and infected currants have been found in Clinton and Niagara Counties. Only one new infection has been found in Pennsylvania, and Michigan has also been added to the list of infected states through diseased pine stock found in a nursery. In Minnesota five new points of infection have been found at Afton, Marine Mills, Pine Hollow (opposite Osceola, Wisconsin), at Franconia, and on the water supply reservation at Lake Vadnais.

Until recently considerable effort was expended in scouting localities where infection was known to exist last year and diseased pines were destroyed. The efforts during the balance of the summer will be confined principally to controlling the disease by destroying currants and gooseberries. The work of eradication is being pushed as rapidly as possible. In each of the New England States one or more areas of heavy pine growth have been selected for the destruction of all currants and gooseberries. These areas will serve to demonstrate the feasibility of controlling the disease and the boundaries of the areas will be extended as rapidly as possible. In New York the heavily infected pine area in Essex County is being isolated by pulling currants and gooseberries from a strip two miles wide which, when finished, will extend through the Ausable Valley, from the Canadian border to Lake George. Last year a strip of this character was made through Columbia County, New York, to stay the advance of the disease from Massachusetts. Later in the season this line probably will be extended northward through Rensselaer and Washington Counties to Lake George. A similar strip a mile wide is being cleared of currants and gooseberries from Lake Ontario to Niagara Falls and the southern extremity of Grant Island. This strip was cleared on the suggestion of the Canadian authorities, who are now completing the eradication of currants and gooseberries from a mile-wide strip along the Niagara River from Niagara-on-the-Lake to Fort Erie. A large force of scouts is engaged searching for the disease in all of the eastern states where the disease was not found last year, including the Southern, Rocky Mountain and Pacific Coast States where five-leaved pines are native, but special attention is being given outside of New England and New York to the Lake States.

EDITORIAL

ARKANSAS SUPPORTS THE NATIONAL FORESTS

THE recent Legislature of Arkansas passed an Act authorizing the Federal Government to acquire by purchase lands within the State for National Forest purposes. This is simply another indication of the changing attitude towards National Forests in the West. Two National Forests were established in Arkansas several years ago, and ever since have been the butt of fierce attacks on the part of various congressmen from that State who sought to have them abolished and thrown open

to settlement and timber exploitation. Congress did not yield to this pressure, and examinations showed that the lands were not fitted for agriculture. Where any doubt existed as to this classification, the areas were eliminated.

By this recent action the people of Arkansas have at last placed the stamp of approval on the Forest administration. The law will enable the government to acquire much-needed areas within the forest boundaries and consolidate them for fire protection and the production of timber.

A VISITATION AND A MORAL

THE memory of the terrors of the Hinckley and Bandetti fires did more to prevent the passage of the Public Domain bill in the Minnesota Legislature, with its proposed disruption of the State Forest Service, than all other factors combined. As this is written, the State is again in the grip of the fire fiend. The dangers of these violent conflagrations, driven by the wind through the tops of trees, is extreme, wherever the country is comparatively flat and densely covered with timber or slash. They resemble the disastrous fires which at intervals destroy large districts in our big cities, in spite of the most thorough preparation and the high efficiency of the fire departments in those communities.

Perhaps this series of conflagrations will serve to impress still more firmly upon the public mind that the State Forester's Department must be kept as it is, absolutely free from politics, and furnished with the necessary funds and support to maintain at least the skeleton of an organization for controlling fire in the vast timber areas of northern Minnesota. Where short-sighted policy per-

mits this department to become the prey of spoilsmen, in that day the efficiency of the service ceases, and citizens of the north country are left to their own devices to cope, without direction or plan, with this monstrous enemy.

The State Legislature, through the action of the Senate, refused to sanction the restoration of the appropriations of the Forestry Department to the sum of \$75,000 from which they were reduced two years ago to half that amount. The overburdened state rangers, each one with over a million acres of territory to supervise, cannot possibly cope with the extreme danger of a dry season without more help. Yet recently the work and responsibilities of these men were greatly increased by imposing upon them duties formerly exercised by the surveyor generals of logs and lumber in order to save the State money.

If the State of Minnesota ever expects to be freed from the recurring blight of forest fires, it must be through the strengthening and upbuilding of her State Forestry Department, as at present constituted.

COLORADO REDEEMS HERSELF

A POLICY so utterly opposed to the pioneer spirit of individualism as that set forth in the reservation and development of the National Forests was certain to arouse bitter opposition in the West. New ideas are not received cordially when they threaten to interfere with cherished personal privileges and business opportunities. Here was a plan apparently worthy to be classed as a product of the brain of some utterly impractical theorist. The Government actually proposed, in all seriousness, to set aside immense areas of public land as "Forest Reserves," for purposes but dimly comprehended, except that it was evident that no more timber claims could be located, nor "homesteads" filed on for the purpose of acquiring title to timber. For a while, even mining claims were prohibited, and grazing was prevented as being injurious to the forest.

Western people, imbued with the spirit of liberty and optimism, and impatient of restraint, accustomed to regard public lands as the great field for exploitation and development upon which the further progress of the states depended, instinctively protested against this policy, and this opposition was especially strong and bitter in Colorado.

But the founders of the National Forest policy were more far-seeing than the representatives of the pioneer area—which was already passing. They realized the evils of unrestricted private ownership, especially its effect upon the forests. They considered the effect of the forest cover upon the flow of water for irrigation, and the necessity for regulating the grazing upon these lands. Theirs was a new vision, of a future era when coöperation and the recognition of the rights of all classes of citizens would

supersede the somewhat brutal and blind policy of *laissez faire*—the old idea that by permitting the strongest, most able, and also the most unscrupulous and cunning to have their own way, the best results would be obtained.

Since this new doctrine did not contemplate depriving the public of the resources of these forest reservations, but rather strove to make them available, the public soon learned that under the rules and regulations worked out by the government, they could secure timber, graze their stock, prospect for and develop mines, and harness the national water powers, while at the same time the great farming interests observed that fire protection and the restoration of the forest cover on the watersheds controlling their supply of water for irrigation, was for the first time becoming efficient.

The crest of the opposition was reached in 1907, but two years after the transfer of the National Forests to the Department of Agriculture—and was due largely to the fear and wrath occasioned amongst the advocates of the old school by the rapid extension of National Forest areas in the two years preceding. In this year six states, Colorado leading, secured congressional action which put an end to the creation of further National Forests, except by specific authority of congress in the future.

For several years thereafter, the area of National Forests in these six states either remained stationary or diminished by elimination of areas unsuited to the purposes of the forests. Meanwhile, the real purposes behind the forest policies became more and more clearly comprehended by western people, and the great benefits

of intelligent and efficient administration spoke more forcibly than arguments.

In 1916 bills began to appear in congress authorizing the President to make additions to existing National Forests. For the most part these dealt with small areas, and were significant only as indicating the tremendous revolution in public attitude which has taken place in this decade toward the *ideas* embodied in the National Forest policy.

But it remained for Colorado to give expression to this current of opinion in a way that no one can mistake. In spite of opposition of a particularly virulent and vindictive character, the people of the agricultural districts, dependent upon the watersheds for their very existence, demanded and secured authority from congress for the addition of over half a million acres of public land to the Colorado and Pike National Forests. And in this they had the support of mining associations, county commissioners and every commercial interest in the district affected.

This country will never tolerate the substitution of an autocratic bureaucracy for the liberty of thought and action to which we are accustomed—but we are fast learning that our rights and our prosperity are best secured through an efficient public administration by trained experts, whose duty it is to carry out policies formulated to secure the greatest good to the greatest number. This new Service is responsive to popular demand, but is able to distinguish between the selfish desires of the few and the permanent benefits for the many. Its true spirit is coöperation—and coöperation will win.

THE DIPLOMATIC FOREST RANGER

BY W. G. MORISON

THE work of a Forest Ranger or Guard during the fire season is, of course, taken up very largely in preventing fires. Since the greatest danger is from campers, hunters, and fishermen, who through carelessness or ignorance throw down lighted matches, cigarettes, etc., or build camp fires where they should not or go away leaving them burning, it is essential that they be warned, and it is equally important that they be warned in such a way that they will not take offence. I have known campers who have been left in a very antagonistic frame of mind by being told in a tactless way to be sure and not start a fire, and how not to start one, the law for such offence, etc., and consequently did not care much if one did start, and certainly would not have helped fight one unless forced into service by reciting the law to them, which is worse than not having them at all.

It is very easy to get the coöperation of most of the people who come into the woods for recreation (the natives of the woods usually are as anxious as the Forest officers to prevent fires) by several little ways without even letting them know that you are trying to do so, for instance: a Ranger or Guard sees a fisherman; he goes down towards him, and when he sees that he is seen, he

incidentally tells the fisherman thereby who he is, and probably has him thinking unconsciously of fire already. Having done this, he goes up and says, "Hello, had much luck?" and then engages in a conversation as to the pros and cons of fishing (no better way to please a man than by talking about the thing he is interested in at that particular moment). During the conversation he glances around as if looking for smoke (remember the idea is to get the fisherman's mind centred on smoke, and smoke means fire). After a while he says, "Well, I guess I will have to be getting on, pretty bad time for fire." The fisherman then probably says something such as "Had many this year?" or "Has there been much damage done around here?" This gives the Forest officer the opening he is looking for, and he says, "No, not so far. Have been mighty lucky in having 'old timers' around who realize the damage done by fires and are careful. You can spot them every time. Now, I can see you are far from a green one in the woods from the way you handle your rod and line," or anything like that to flatter him. If he is an "old timer" he will admire your powers of observation; if he is not, he will be tickled to death to think that a Ranger, who is supposed to be the best of woodsmen,

could not spot him, and his chest will bulge out considerably. In either case the Ranger has pleased him, and the chances are one hundred to one he will have no trouble with that man starting a fire. On the other hand, suppose the fisherman does not give him an opening: in that case, the Ranger stops and says, "By the way, did you see any camp fires coming down the river?" The fisherman says "No." Then the Ranger, "I certainly would appreciate it if you would put out any you see burning. We have some people who come up here who are not used to the woods, and naturally do not realize the importance of putting out their fires or that a little spark from a cigarette or match is very dangerous." The Ranger has now warned the fisherman by pretending to be worried about others, and at the same time pleased him by pretending to think the chances of his being so careless are so remote that it is unnecessary to warn him. The same mode of procedure applies to hunters and campers. The Ranger can always bring the conversation around to his work, and, by a little tact and politeness, go away resting assured of the fisherman's, hunter's, or camper's cooperation.

Suppose he has come onto some campers: he walks in, not forgetting to be looking for smoke, and after the usual day's salutation sits down. After talking about things in general, he gradually brings the conversation around to cooking in the open. Most of them will have some opinion as to the best way. Of course, he will be supposed to give his ideas on the subject. He might say something like this: "Personally, I think a stone fireplace is the best. It makes a cracking place to cook on (all the time he is showing them how to make one), and if you bring along a piece of sheet iron to lay on the stones you will have a regular stove, or should you forget the sheet iron (the chances are they have none with them this time), you can easily make the fireplace narrow enough to rest your frying pans on the stones, and then, too, a fire of this kind is not so apt to start a forest fire." Then he has the conversation started on forest fires, having told them of the fireplaces, which is important. He now has them in a good state of mind, and their attention his, and he can tell them lots which ordinarily would go in one ear and out the other. I personally have tried these ways of inciting the interest of the users of the National Forests, and found they never failed to bring good results.

JACK LONDON'S OAK

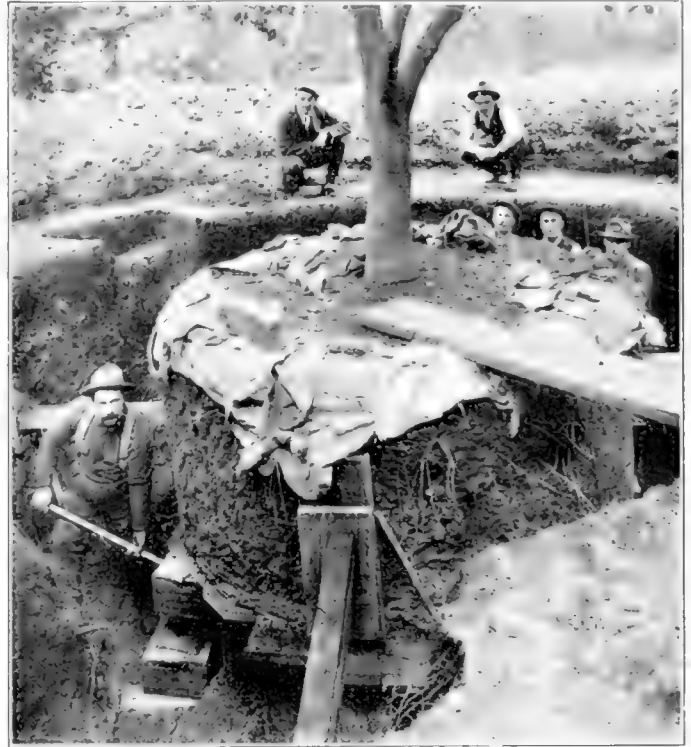
JACK LONDON'S memory is kept fresh in the minds of the people of his native city, Oakland, California, in a fitting manner. A sturdy oak tree, personifying the character of the famous author, has been planted on the plaza before the city hall. Here, surrounded by a fine lawn and with a beautiful building for a background, it occupies alone the most conspicuous place in the city. The dedicatory resolution of the City Council of Oakland expresses in words the esteem for the author, which the planting of the oak exemplifies.

"A resolution of the Oakland city council, calling

memory of Oakland's author and dedicating the city's standard-bearing oak to his name—Jack London.

Proud his city that there came a lad who lived and grew to world's renown by striking chords that until his time had been unsung.

Sad our city that life for him, a narrow vale wherein he spoke and gave a radiance for all mankind; and that his life was short, a sacrifice for experiences that remain aglow for you and me.



HOW OAKLAND'S OAK WAS TRANSPORTED

Having been excavated with the large ball of earth about its roots, this seventeen-year-old tree was carted from one section of Oakland to another and was successfully replanted.

Glad that we can confer this mite of honor by dedicating Oakland's standard-bearing oak to him who grew with this city, that this sturdy sentinel may stand in memory and to honor Jack London."

The moving of this seventeen-year-old tree from its birthplace in Mosswood Park to its new location was one of those feats of engineering which were considered impossible a few years ago. The transplanting of a tree is always difficult because the root system must be protected from drying-out and excessive cutting-back, if the tree is to live. One drying gust of wind on the small living root hairs may kill the tree. When a tree reaches a height of twenty-four feet and is thirteen inches through at the base, the magnitude of the task is easily imagined. A circular trench six feet deep and fifteen feet in diameter was dug around the base of the tree and the ball of earth about the roots was carefully boxed to prevent breaking and exposure of the roots. A big truck transported the tree to its new home, where it was successfully transplanted. The fact that the young tree withstood one of the heaviest windstorms the city has experienced in years, after being in its new home only two months, shows how well-chosen it is to typify the sturdy, rugged man, Jack London.

NATIONAL PARK SERVICE ORGANIZED

THE National Park Service, which was created by act of Congress in August, 1916, to administer the National Parks under one correlated system, has been organized under appropriations made in April. Secretary Lane has appointed as Director Mr. Stephen T. Mather,



STEPHEN T. MATHER

Director of the National Park Service who has done remarkable work in developing the parks.

who, to accept the place, resigned the office of Assistant to the Secretary of the Interior. Horace M. Albright becomes Assistant Director, and Frank W. Griffith, Chief Clerk of the new bureau.

Secretary Lane began the work of National Parks development, the success of which is insured by the organization of this new bureau, two and a half years ago. During this preliminary period much has been accomplished of importance to the cause. All National Parks have been opened to automobiles. New roads have been projected, of which many have been built and many improved. Coöperation in the public interest has been promoted between railroads and the Government, between concessioners and park managements, and between parks. Large private capital has been induced to enter several

National Parks for the enlargement and improvement of hotel and transportation service. Prices to the public have been decreased wherever possible.

New concessions have been made on a basis destined to make National Parks self-supporting under conditions of increased patronage, and several parks already have become self-supporting. Larger appropriations have been secured from Congress for road building and the perfecting of sanitary and other conditions. An extensive educational campaign has been inaugurated for the information of the people concerning the hitherto unknown quality and extent of their scenic and recreational possessions, under which public interest in our National Parks is growing with unanticipated speed; and public realization, interest and practical use is the condition as well as the object of National Parks development. Public patronage of the parks has increased rapidly and steadily.

These and many other beginnings point the way toward the system which it will be the object of the new Service to build and perfect.

Stephen T. Mather, the head of the Service, was formerly assistant to the secretary, in which office he had supervision of the National Parks, and, in addition, other Departmental work. He resigned that position to become Director of the National Park Service, in order that he might devote his entire time to the park work. He was born in California in 1867, and educated at the University of California. He then removed to New York and engaged in newspaper work. Later he entered the business of manufacturing borax and boracic acid as a member of the Thorkildsen-Mather Company, with offices in Chicago. He has devoted time, energy and his own money to National Park work and has been a remarkably successful official.

E. A. STERLING'S NEW WORK

Mr. E. A. Sterling, a well-known forest engineer, who for the past two years has been manager of the Trade Extension Department of the National Lumber Manufacturers' Association, at Chicago, has resigned to become manager of the new eastern office of James B. Lacey & Co. This office, which will be in the Forty-second Street Building, New York City, will be opened about August 1. In connection with his new work Mr. Sterling will also take up some of his former consulting practice as part of the activities of the office of the Lacey Company. Mr. Sterling was for several years in the United States Forest Service, and later was a partner in the forest engineering firm of Clark, Lyford & Sterling, which has headquarters at Vancouver, B. C. Mr. Sterling had charge of the eastern section of the United States, with offices in Philadelphia. For several years Mr. Sterling has been a director and member of the executive committee of the American Forestry Association.

AMERICAN FORESTRY MAGAZINE PRAISED

"I am thoroughly in sympathy with all your aims and I find your magazine not only very interesting but essential to the arboriculturist who is trying to keep in touch with the imported insects and fungi."

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Philadelphia, Pennsylvania.

"I am very much interested in the articles in AMERICAN FORESTRY, especially in regard to birds, their habits, etc."

R. D. DOUGLASS,
New York City.

"The steady improvement in the magazine which you edit so admirably will undoubtedly add a large number to the roll of the American Forestry Association."

DR. W. R. FISHER,
Swiftwater, Pennsylvania.

"I have received nine numbers of your paper, AMERICAN FORESTRY. Have read them with much interest. It is the most human paper on forestry that I know of, and very instructive and well got up."

G. L. DE LA C. FULLER,
*Kashmir Woods and Forests,
Srinagar, Kashmir State, India.*

"The magazine as now published is one of the most interesting we get in our office, so much so that we figure on having them bound for future use, and trust that the good work shown so far will be continued in the future."

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"I want to voice my appreciation of your AMERICAN FORESTRY. It is always of great interest to us."

JUNIUS E. BEAL,
*Public Domain Commission,
Ann Arbor, Michigan.*

"It would be hard to tell you how much we enjoy and profit by your publication. Yesterday a girl who is now in the Normal School said she read it each month. With the boys it is as popular as a magazine on Electricity, Autos or Mechanics, and one girl gave her report in an English Class on White Pine Blister Rust."

"The articles by Mark Daniels are a joy to any one who has visited the National Parks and a lure to any one who has not."

"I wish I could send the magazine to more of my friends as a Christmas gift, but in the meantime it is giving to many boys and girls a taste for the best and most worth while things. We take it in our school library."

NAOMI ACHENBACH,
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"I am greatly pleased with the work of your Association the past few years. It has been sound and wholesome and no one has used it as a political football."

G. D. JONES,
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"The magazine in its new form certainly deserves great praise."

ROBERT S. STOCKTON,
Strathmore, Alberta, Canada.

"November number is superb—especially 'Trees in Medicine.' Don't see how you do it, fellow worker."

CHARLES H. SHINN,
Northfork, California.

"After carefully going through your February number of AMERICAN FORESTRY, I cannot refrain from expressing my appreciation of its excellence. You have succeeded in building up an exceptional magazine and I trust that its success may continue."

THOMAS B. WYMAN, *Director,
Wyman's School of the Woods,
Munising, Michigan.*

"I read AMERICAN FORESTRY each month. It is doing such great good for our trees and forests and is always full of wonderful and beautiful scenes"

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"I am greatly pleased with your magazine and with the work you are doing, am recommending it to my friends and a number of them have subscribed and are in turn furthering the cause."

GEORGE W. FISS,
Philadelphia, Pennsylvania.

"I wish to compliment you on the attractiveness of the magazine, and the manner in which it is being improved."

CHARLES A. HOAG,
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"Your magazine has been coming regularly to this office for more than six months, and I look on it as one of the most informative and valuable magazines of the day."

M. G. CHAMPION,
*Public Parks Board,
Winnipeg, Canada.*

"I have received my certificate and magazine and am more than pleased and delighted to know of the great good you are doing."

F. I. DIXON,
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"May I thank you for the pleasure derived from reading the splendid articles in AMERICAN FORESTRY about Wild Flowers?"

JULIA A. THORNS,
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"How well you do things in America! Your Forestry Magazine is a fine one, and your work most interesting and valuable."

DR. J. A. LEACH, *Editor,
The Emu,
Omeo, Australia.*

"A friend sent me a subscription to your magazine and I haven't had a present in years that has already given me as much pleasure, and just think of all the numbers still to come."

MRS. CHARLES G. CAROTHERS,
Memphis, Tennessee.

"Permit me to make use of this opportunity to commend very highly the official publication of the American Forestry Association. It is worthy of all praise."

ROBERT S. WOODWARD,
Washington, D. C.

"I am deeply interested in the conservation of our forests and it gives me a great deal of pleasure to be identified with an Association which is accomplishing such excellent results in this direction."

JOHN W. WEEKS,
Washington, D. C.

"I have recently become a member of the American Forestry Association and I am reading your magazine with keen interest. It is very well gotten up and most excellently printed."

LEWIS EDWIN THEISS,
Lewistown, Pennsylvania.

CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY, CANADIAN SOCIETY OF FOREST ENGINEERS

The Report of the Forest Branch of British Columbia for 1916 is just out and is very interesting and shows what such work, properly conducted, can do for a country. Trade extension in wood products has been carefully studied and efforts made to increase the markets for and the consumption of timber. Heretofore southern pine has held the eastern Canadian market, but Douglas fir has been brought to the attention of architects, city building departments and other wood users and much very creditable advertising has been done. Exhibitions have also been held in many eastern cities. Mills are also put into touch with enquirers and possible customers. The Prairie Provinces have also been carefully canvassed and the same methods used to induce their people to use British Columbia timber as in the East. Foreign trade has also been carefully studied, but the difficulty of obtaining ships has greatly hampered the export trade. The British War Office has done considerable buying of boxes in British Columbia. The estimated value of the total lumber production for 1916 is \$35,528,000 and the total timber scaled amounted to 1,280,000,000 feet. B. M. logging operations increased and were carefully inspected; 1648 inspections were reported. Land classification work was carried on, 144 examinations being made. Manufacturing and export statistics were also collected and these showed that the pulp and paper industry has obtained a foothold, 65,229 tons of paper and 14,389 tons of sulfite wood-pulp being manufactured. Reconnaissance work had to be

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abandoned altogether as so many of the field force are absent at the front. Forest protection was carried on as in the past, but owing to shortage of men a less number were employed. The total damage estimated amounted to \$49,913.00, as against \$108,873.00 for 1915 and \$72,057.00 for 1914. The people are beginning to realize from the Forest Branch's campaign of education the necessity of care and are beginning to cooperate heartily. The report shows that the work is being kept up to the same high standard which was set when the work was started and with a strong personnel and good *esprit de corps* this will be continued.

The Manager of Eastern Lands of the Canadian Northern Railway has just returned from a trip through Northern Ontario and says that he believes that there are tributary to the present railways and waterways leading to them, 250,000,000 cords of spruce pulpwood in Ontario and 350,000,000 cords in Quebec. He says that it is useless to consider timber north of the Transcontinental Railway, as the rivers run north, and only a small portion could be brought upstream by building dams which would enable the wood to be towed back.

The campaign against the white pine blister rust is progressing under the Dominion and Provincial Governments. Subject to the general supervision of Dr. J. H. Grisdale, Acting Dominion Botanist, the field work is in charge of

W. A. McCubbin, of the Field Laboratory of Plant Pathology at St. Catharines, Ontario. A senior and two junior assistants are provided who will specialize in research work calculated to determine the best methods of control of the disease. The actual work of scouting for the disease and eradicating it will be done by men provided by the Forest Services of Ontario and Quebec, respectively. The salaries of these men will be paid by the Provinces and their traveling expenses by the Dominion. There will be twenty in Ontario and the same number in Quebec. Until June 10 the work of location and eradication will be confined to white pine; after that date similar work will be done on currants and gooseberries, the alternate hosts of the blister rust. Work is now under way of clearing both wild and cultivated currants and gooseberries from a strip a mile wide along the bank of the Niagara River, from Niagara-on-the-Lake to Fort Erie, to form a safety belt which will prevent the disease from passing over the river into New York State. On the New York side of the river, similar work will be done by the state for the protection of Ontario. Pine in this territory on both sides of the river will be dealt with later, if necessary. In connection with the location of the disease on currants and gooseberries, it is proposed to utilize the services of school children. The stage of the dis-

ease on these plants is easily recognized and the pupils will be able to render a valuable public service by reporting any outbreaks found. Literature and colored illustrations will be furnished and instructions given through the teachers.

The necessity for uniform statistics of forest fires and the damage caused by them is a subject of great importance and likewise of considerable difficulty. It would seem to be necessary to have, whenever a fire occurs, the date, location, cause, area burned over, stand before the fire occurred, timber which can be salvaged, and timber burned. Value of timber or other resource destroyed is also important. The last three items are very difficult to ascertain. Protective agencies cannot be expected in the nature of the case to cruise and accurately determine the amount of timber on areas under their care. The ordinary fire ranger is certainly not qualified nor has he the time to make a careful estimate of the amount of timber which can be salvaged, nor the value of the trees destroyed. At best the most he can say is: green timber destroyed, or old burn, or logging slash or some such general description, and he can say timber scorched but fit to cut, timber all burnt, etc., and none of these designations are of any real value for statistical purposes. In fact, the determination of areas is really often beyond the capacity of the ranger, and again the difficulty of leaving

his patrol to measure burnt areas crops up. Then when the question of valuing such damaged areas is encountered, further difficulties enter. Only an expert in local values is competent to say what timber is worth. The question of the value of young growth, of scorched timber and of areas which have just started to reproduce is a trying one and no two owners will agree as to the value placed on such areas. Much preliminary work is necessary, especially in country which has not even been carefully mapped, such as all of the Canadian Coöperative Associations are operating in. It might be possible for these Associations to undertake such mapping and estimating work. This would give winter work for rangers and inspectors, a very important matter indeed.

Forest fires are said to be raging in the organized and unorganized districts around Fort William and Port Arthur in Ontario, destroying large areas of timber and uncut pulpwood. Bush fires have been raging in fully a hundred sections west of Fort William since last week and much territory near Commee and beyond has been burnt.

Professor W. N. Millar, of the University of Toronto, has gone to the United States to help organize a Forestry Corps for work in England. This leaves only Drs. Fernow and Howe on the teaching staff of the Forestry School.

Dr. Howe, who is making studies of cut-over lands and the reproduction of pulpwood on them for the Commission of Conservation, has returned from a two weeks' reconnaissance trip north of Grand Mere, which he took in order to plan out his summer's work.

The Minister of Lands and Forests has sent out a circular letter to all licensees of timber lands in the Province of Quebec urging them to join the coöperative fire protective associations and warning them that if they do not he will enforce to the limit the requirements and penalties of the forest-fire laws. Practically all of the limit holders have joined. The notable exceptions are owners who from their standing and prominence should be more public spirited and should know better where their interest lies.

The summer meeting of the Technical Section of the Pulp and Paper Association will consist of a trip to the industrial centres of the St. Maurice Valley, where the large paper mills, water power installations, carbide and aluminum works will be visited. The members will leave Montreal on a special train of two sleepers and a diner and will be the guests of the Laurentide, Belgo-Canadian and St. Maurice Paper Companies.

The inquiry being held by the Canadian Government into the cost of producing newsprint paper is progressing slowly, and meanwhile the price fixed by the Government is still being charged by the producers. The prices of wood, wages and supplies are still rising.

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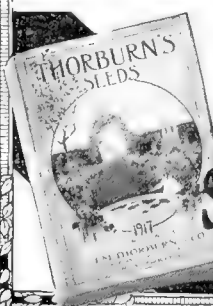
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Revue des eaux et forêts, April 1, 1917.—

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Schweizerische zeitschrift für forstwesen.

April, 1917.—Zur frage der waldsamenprüfung, by A. Engler, p. 109-23.

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år (Karl Fredenberg at 60 years old), by Gunnar Anderson, p. 137-9; Våra skogar i Kristider (On forests in times of crisis), by Henrik Carbonnier, p. 139-43; "Skogsgård," en modern demonstrationsskog (A modern demonstration forest), by Uno Danielsson, p. 144-9; Nagra fall av skadegörelse å växande skog (Some instances of damage in growing forests), by Erik Geete, p. 150-5; Jätteekarna på Gällstaön (The giant oaks of Gällstaön), by Carl G. Alm, p. 156-61.

Tidsskrift för skogbruk, April-May, 1917.

—Skogskultur (Forest culture), p. 85-8; Enkelte traek fra snauhugstperioden i Akershus amt (Some features of the clearing period in Akershus Amt), by Kildal and Rolsted, p. 88-104; Er Troms amt granens fremtidsland (Is Troms Amt the land of the future for Norway spruce), by Hanna Resvoll-Holmsen, p. 104-9; Forskvis sammenligning mellem tømmerprisene i Skiens—, Glommens—, og Drammensvasdrag (Experimental comparison between timber prices in Skien, Glommen and Drammen watersheds), by Waldemar Opsahl, p. 109-15; Litt om de skogstatistiske undersøkelser (A little concerning the forest statistical investigations), by J. K. Sandmo, p. 115-20.

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Trade-marked Cypress

"THE WOOD ETERNAL"

The following editorial item is from the May 10th, 1917, issue of the LUMBER WORLD REVIEW. (It is worth reading because it is *true*—and *worth reproducing here* because you probably don't read lumber trade papers.) We submit it without further comment.

Note the Emphasis it puts on the *Relative Value of Genuine*

Tide-water Cypress

Please do not be diverted by the small type—
it's A STORY WORTH READING.

(From the "Lumber World Review," May 10th, 1917.)

"CYPRESS TRADE-MARK WINNING BIG.—THEIR SLOGAN, 'SAFE BUYING MEANS EASY SELLING,' PROVES GREAT MARKET AID TO RETAILERS.

"Cypress, 'The Wood Eternal,' was the first lumber to be exploited through a really large general advertising campaign, and now cypress has 'gone and done it again'—and is winning big by helping its retailers to an 'automatic' market by sponsoring to the ultimate user every piece of cypress made by an Association mill.

"When the Southern Cypress Manufacturers' Association began a campaign of advertising a few years ago, which was to exploit the virtues of cypress, little was known of this venerable wood by present day lumber users.

"But as the stories of its remarkable rot-resisting properties were told time after time, the interest of the lumber buying public in this new-old lumber was aroused.

"It was not long thereafter until the mills of the Southern Cypress Manufacturers' Association were working to capacity to fill the orders for cypress which after more or less neglect had again come into its own.

"And then followed what usually follows any marked success in merchandising in these days of intensive buying and selling. Inferior, or upland, cypress (and some carelessly manufactured cypress) began to share unduly in the results of public faith, and it became necessary to protect the lay consumer and at the same time protect the conscientious manufacturer and the honorable and up-to-date preponderance of retailers.

"The general public was not aware that there was a considerable difference between 'tide-water' cypress and the cypress that grew too far inland—but experience began to teach them that while one was 'eternal' the other was more or less temporal and 'fleeting.' One was truly rot-resisting

while the other failed to justify the confidence of the user in its rot-defying character.

"So the already famous cypress arrow trade-mark was devised as an insurance policy for both seller and user. The value of a trade-mark need not be dwelt upon. The manufacturer who won't sign his product will never get very far with it, in these days. The quality must be maintained if the product is to survive the fierce battle of business.

"And so now genuine 'tide-water' cypress (the most eternal of the Wood Eternal) is no longer bought by name alone or on faith—but by a brand back of which is a group of manufacturers including most of the larger and more responsible producers of cypress. As a further testimony of 'pride in their product,' the output of each mill is being identified by the serial number of that mill incorporated in the trade-mark as applied to each mill. The move is one in the right direction, the most important one ever taken by any lumber manufacturers, and is more than justifying, even this early, the well-known cypress slogan which recites that 'the only permanent safety for the seller is perpetual safety for the buyer.' This is the keynote.

"RETAILERS ARE ALREADY EXTENSIVELY REFUSING TO BUY 'ANONYMOUS CYPRESS,' AND ARE SHOWING THEIR UP-TO-THE-MINUTE ACUMEN BY SPECIFYING THE TRADE-MARK ON ALL THEIR CYPRESS ORDERS. THIS IS THE MARK WHICH IS NOW STAMPED ON THE TIDE-WATER CYPRESS—(THE 'WOOD ETERNAL')—MANUFACTURED BY THE ASSOCIATION MILLS.

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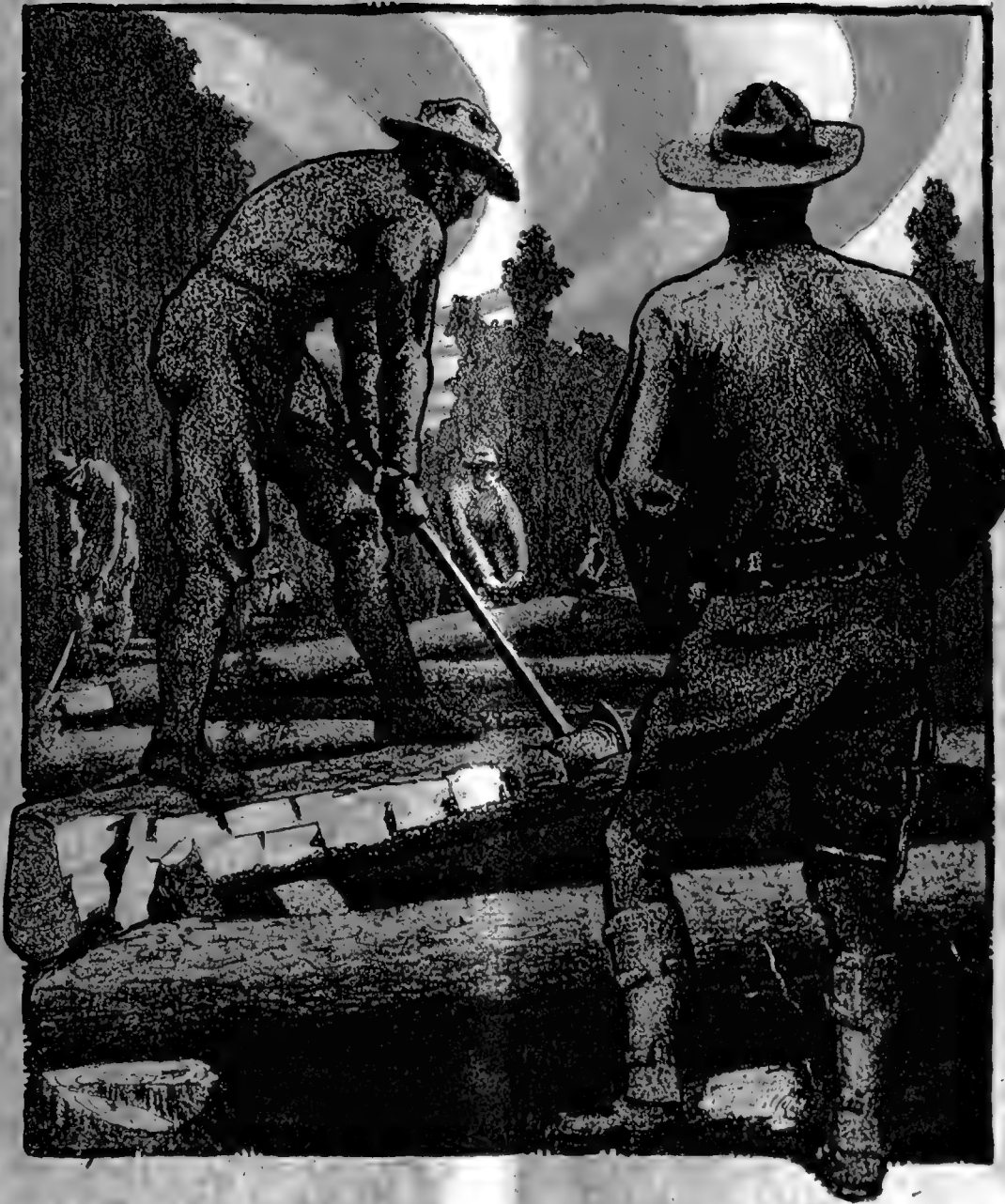
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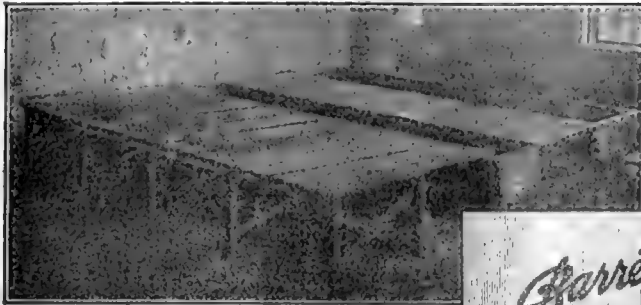
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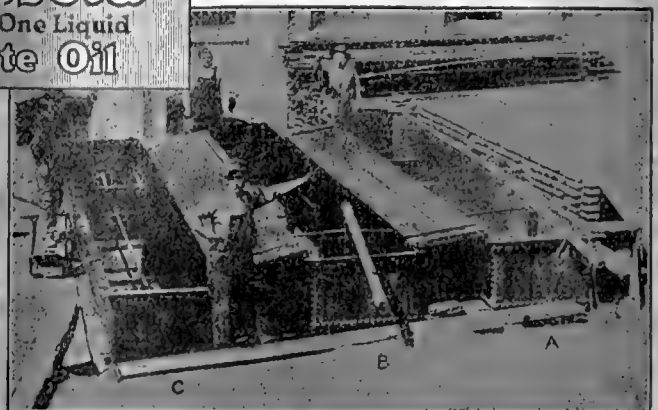
Permanent plant erected by copper mining company; constructed of steel consisting of two tanks, one for "hot bath" and other for "cold bath." Used for creosoting timber and lumber used in surface-structures and mills.



Temporary treating-plant constructed of wood and lined with galvanized sheet iron. Used for creosoting over 250,000 feet B. M. of timber for floor-framing of industrial plant.



Permanent plant for creosoting of refrigerator-car sills and roof-boards.



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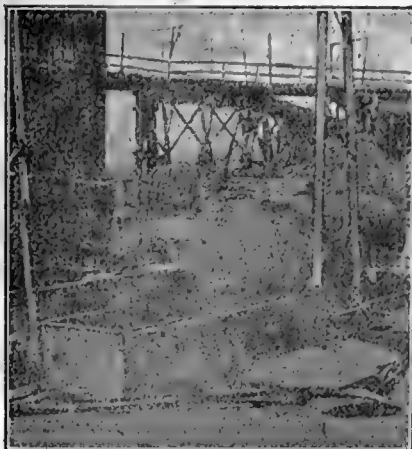
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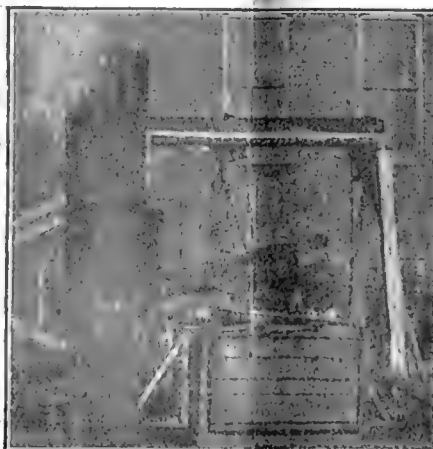
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Temporary plant constructed of wood lined with galvanized sheet iron, equipped with steam-pipes for heating creosote. Used for creosoting roof-timber and -boards for roof over machine-room of paper-mill.



Modern Open-Tank Pole-Treating Plant. (Photo. courtesy Lindsley Bros. Co., Minneapolis.)

AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

AUGUST 1917 VOL. 23

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Subscription price without membership, three dollars per year; single copies, twenty-five cents.

Entered as second-class mail matter December 24, 1909, at the Post-office at Washington, under the Act of March 3, 1879
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REAL ESTATE AND TIMBER

SALE OF TIMBER RED LAKE INDIAN RESERVATION.

SEALED BIDS, MARKED OUTSIDE "BID, Red Lake Timber," and addressed to Superintendent of the Red Lake Indian School, Red Lake, Minn., will be received until 12 o'clock noon, Central Time, September 26, 1917, for the purchase of timber upon about 51,300 acres within Township 150 N., Ranges 32, 33, 34, and 35 west; Township 151 N., Ranges 32, 33, and 34 west. The sale embraces approximately 72,000,000 feet, of which about 65 per cent. is white pine, about 27 per cent. Norway Pine and the remainder Jack Pine, Spruce, Balsam, Cedar and Tamarack. Each bid must state for each species the amount per thousand feet Scribner decimal C log scale that will be paid. The minimum prices per M feet, B. M., which will be accepted are as follows: White Pine \$10, Norway Pine \$8, Spruce \$5, Tamarack \$3, Jack Pine \$3, Cedar \$3, Balsam \$2.50, Cedar and Tamarack ties \$0.08, Spruce and Balsam pulp \$1 per cord. Cedar posts, 7 feet long, 3 and 4 inch tops, \$0.01; 7 feet long, 5 to 7 inch tops, \$0.015; 8 feet long, 4 to 7 inch tops, \$0.02; 8 feet long, 8 and 9 inch tops, \$0.03; 10 feet long, 4 to 7 inch tops, \$0.025; 10 feet long, 8 to 10 inch tops, \$0.08; 12 feet long, 4 to 7 inch tops, \$0.03; 14 feet long, 4 to 7 inch tops, \$0.035; 16 feet long, 4 to 7 inch tops, \$0.04; 18 feet long, 4 to 7 inch tops, \$0.05. Cedar poles, 20 feet long, 4 to 8 inch tops, \$0.08; 25 feet long, 5 to 8 inch tops, \$0.12; 30 feet long, 6 to 8 inch tops, \$0.30; 35 feet long, 6 to 8 inch tops, \$0.60; 40 feet long, 7 to 9 inch tops, \$1.25; 45 feet long, 7 to 9 inch tops, \$1.50; 50 feet long, 7 to 10 inch tops, \$2.25; 55 feet long, 7 to 10 inch tops, \$3; 60 feet long, 7 to 10 inch tops, \$4.50. Each bid must be submitted in triplicate and be accompanied by a certified check on a solvent National Bank in favor of the Superintendent of the Red Lake Indian School in the amount of \$2,500. The deposit will be returned if the bid is rejected, but retained if the bid is accepted, and the required contract and bond are not executed and presented for approval within thirty days from such acceptance. The right to reject any and all bids is reserved. For copies of the bid and contract forms and for other information, application should be made to the Indian Superintendent, Red Lake, Minnesota.

Washington, D. C., July 13, 1917. CATO SELLS, Commissioner of Indian Affairs.

SALE OF TIMBER FLATHEAD INDIAN RESERVATION.

SEALED BIDS MARKED OUTSIDE "BID, Flathead Timber, Ronan Unit" and addressed to Superintendent of the Flathead Indian School, Dixon, Montana, will be received until twelve o'clock noon, Mountain time, Tuesday, September 11, 1917, for the purchase of the merchantable timber upon tribal and allotted lands situated within Sections 4 and 5 T. 19 N., R. 19 W.; Sections 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 32, 33, and 34 T. 20 N., R. 19 W.; Section 21, 22, 27, 32, 33, and 34 T. 21 N., R. 19 W.; Section 1 and Section 12 T. 20 N., R. 20 W. M. P. M. containing approximately 57,000,000 feet of timber, over 80 per cent. Western Yellow Pine. Each bid shall state the amount per thousand feet B. M. offered for Yellow Pine (including "bull pine") and the amount per thousand feet offered for Fir, Larch and other species. Each bid must be submitted in triplicate, and be accompanied by a certified check on a solvent National bank, drawn in favor of the Superintendent of the Flathead Indian School, in the amount of \$2,500. The deposit will be returned if the bid is rejected, and retained as a forfeit if the bid is accepted and the bond agreements required by the regulations are not furnished within 60 days from the date when the bid is accepted. No bid of less than \$3 per thousand feet for Yellow Pine and \$1.25 per thousand feet for Douglas Fir, Larch, and other species will be accepted. The right to reject any and all bids is reserved. Copies of regulations and other information regarding the proposed sale including specific description of the sale area may be obtained from the Superintendent of the Flathead Indian School, Dixon, Montana.

Washington, D. C., May 4, 1917. CATO SELLS, Commissioner of Indian Affairs.

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PROVINCE OF QUEBEC Department of Lands and Forests

Quebec, 2nd June, 1917.

Public notice is hereby given that, in conformity with the law, on the 21st August next, at 11 o'clock a. m., at the office of the Minister of Lands and Forests Dept., Quebec, there will be offered permits to cut timber on lands belonging to the Crown in the Upper-Ottawa, Lower-Ottawa, St. Maurice, Lake St. John, East and West, Saguenay, Rimouski West and Bonaventure West agencies, comprising several large blocks in the Abitibi, Upper-Ottawa and headquarters of the St. Maurice and Gatineau and on River Chamouchouan.

Permits will be adjudged to the highest bidder.

The price of adjudication is payable in three equal instalments.

The permit to cut will be subject to the ordinary conditions of the Law and Regulation and the grantees of any of the aforesaid territory must, within a delay of three years, manufacture, in the Province of Quebec, with the timber cut in said territory, either pulp or paper in the proportion of ten tons per day, or sawn lumber in the proportion of ten thousand feet board measure per day, per hundred square miles.

Further information may be had by applying to the Department of Lands and Forests.

ELZ.-MIVILLE DECHENE,
Deputy-Minister,
Department of Lands and Forests.

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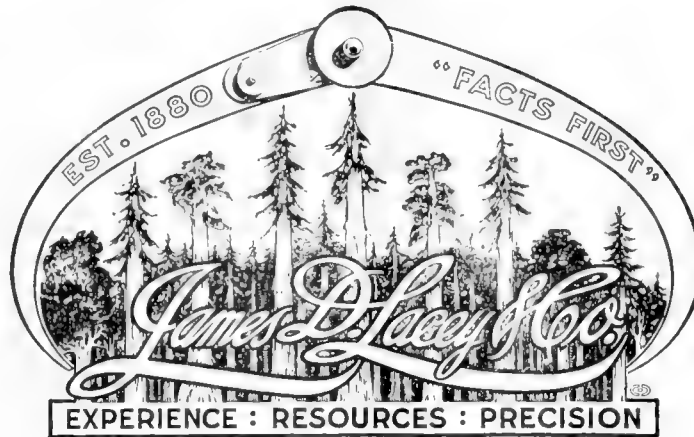
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WRITE TO

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American Forestry Association
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AMERICAN FORESTRY

VOL. XXIII

AUGUST 1917

NO. 284

FORESTERS TO THE FRONT

BY BRISTOW ADAMS

Far from Floridian sands and pines,
From Maine's dark-mantled, spruce-clad hills
From Klamath firs in serried lines,
From Coconino's lumber mills,

We see them come with saw and ax,
With wedge and peavy, hook and chain,
With hardened hands and sturdy backs
To hack and hew for trench and train.

CAPTAIN INMAN F. ELDREDGE, of the Tenth Reserve Engineers (Forest) was peering through the eyepiece of a transit and directing the civilian contractor as to where the corner stakes should be driven for the barracks for housing the regiment to which he had been assigned. The time was late afternoon, and the place was the engineers' camp on the grounds of the American University, somewhere in the northwest quarter of the District of Columbia. If he had not been to the west of the structure, he could have been literally within the shadow of a white marble building, upon the face of which were deep-chiseled words "College of History."

Eldredge's deeds of the day were helping to make the history of tomorrow, but he did not feel like a historical personage—far from it. In getting the ground cleared of sassafras brush and blackberry bushes, he had become the host of a small army of chiggers, and although chiggers can get under them readily, one cannot scratch chigger-bites through leather puttee leggings. Moreover, his mess had partaken of some tinned food a day or so before and there had

been something wrong with that food. The field hospital was taking no chances, so it used up all of a barrel-and-a-quarter of perfectly good castor oil in dosing the Captain and his mess-mates. It was the first castor oil he had ever taken in his life without a preliminary licking and it was a man's-size dose. Military discipline counted for something after all!

Not that he had any objection to military discipline; he took to it like a hound to a rabbit track. As Supervisor of the Florida National Forest he had required uniforms and insignia of rank for all his Forest officers. He knew the value of inspections and of strict lines of accountability. He had wanted to get into the war from the day it was seen to be inevitable, and on another day shortly after had passed the examination for a captaincy in the Engineer Corps. Small wonder that he was assigned to the popularly so-called Forest Regiment in May, as soon as its formation was assured.

It must not be thought that Eldredge had no ideas about history. Even the chiggers could not get his mind off the fact that he was demolishing a Yankee fort which was one of the defenses of Washington



LIEUTENANT COLONEL JAMES A. WOODRUFF

A regular who has been designated by the War Department to organize and command the first of the Forest Regiments.

during the Civil War. He was from South Carolina; his father had tried to do, in a different way, what he was accomplishing with ease and a plow and scraper



MAJOR HENRY S. GRAVES

Chief of the United States Forest Service, who has received a commission as Major in the Reserve Engineer Corps but has not been assigned to any command. For the past two months he has been in France preparing for the work which the Forest Regiments are to do when they arrive. Major Graves is a vice president of the American Forestry Association.

in the hands of two sweating negroes. This ground, tortured into earth-works and rifle pits for Fort Gaines in 1861, was here being leveled off for the barracks of a new army made up of the sons of those who had fought against one another. The easy careless cadences of southern speech here met the tight twang of the northerner, and also the words of the westerner, which were of neither variety. Only a short distance away the earth was torn up anew, however, where engineer forces were putting into effect the lessons learned in the present war.

So here he was getting the barracks ready.

Here, too, was Captain E. S. Bryant, helping to lay out the company streets. Captain Arthur Ringland, who had formerly watched over the destinies of the National Forests of the Southwest, known to the Service as District 3, was quartered in Number 4 barracks nearby. Others were gathering from all over the continent; Benedict from British Columbia, Chapman from Oregon, Guthrie from Arizona, Mason from

California, Skeels from Montana. Some from the Forest service, some from forest schools, some from lumber companies. The head of the Forest Service, now Major Henry S. Graves, was on this day already in France, with Captain Barrington Moore, looking over the ground to make plans for the actual work at the front. Major Greeley, with some fourteen others, went over early in August.

Why a forest regiment? Any three of a number of reasons will suffice. In the first place, the War Department asked for such a regiment, being prompted to make the request by a suggestion from the British Commission, which visited this country soon after hostilities between Germany and the United States were officially recognized. In the second place it could be readily seen that the work would be of great use, not only to the United States and its Allies generally, but mainly to the French, whose forests were being terribly devastated. This devastation was bad enough in the zones of actual warfare, but it might



MAJOR W. B. GREELEY

Assistant Forester in charge of the branches of silviculture and research, U. S. Forest Service, who has been active in the organization of the Forest Regiment and who led the party of fourteen officers which sailed for Europe early in August. Major Greeley is a director of the American Forestry Association.

be lessened if the forests back of the line, which were furnishing timber imperatively needed for war purposes, could be cut with the least of permanent dam-



MEMBERS OF THE FOREST REGIMENT

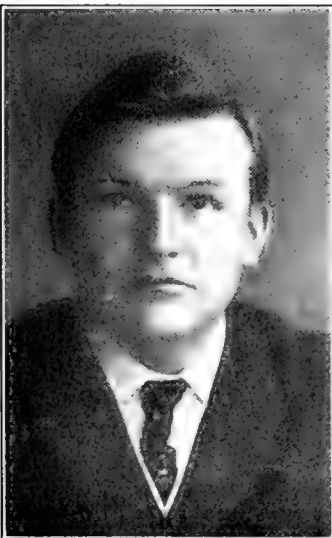
These men, many of whom are newly arrived, lined up for inspection at the camp on the grounds of the American University, Washington, D. C. They come from all parts of the United States and are keen, efficient and skilled in forestry and lumbering.

age. In the third place, the field force of the Forest Service wanted to go.

The last-named reason furnished a considerable problem. At first it was understood that Mr. Graves didn't care to have members of the Service leave their work on the National Forests. They represented a fundamental need at home. The organization so ably started by Gifford Pinchot, upon whose broad foundations Henry S. Graves had continued to build, had become a permanent structure which had withstood a good many storms. It was strong and no one who had anxiously watched its growth wanted to see it

weakened. To put its best men overseas threatened just this weakness.

It may be said, therefore, that Mr. Graves desired to hold it intact. He had had a chance, during the very earliest stages of the trouble with Mexico three years before, to see what would happen. Then the Forest field force, almost to a man, wanted to organize itself into cavalry to sweep across the border. A roster of available men with the records of the special service for which each was fitted was in the hands of the authorities at Washington. Only a word was needed to put into the field a well-mounted, hard-



MAJOR C. S. CHAPMAN
Manager of the Private Lumber
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CAPTAIN DORR SKEELS
Logging Engineer and Professor of
Forestry at the University of Mont-
ana.

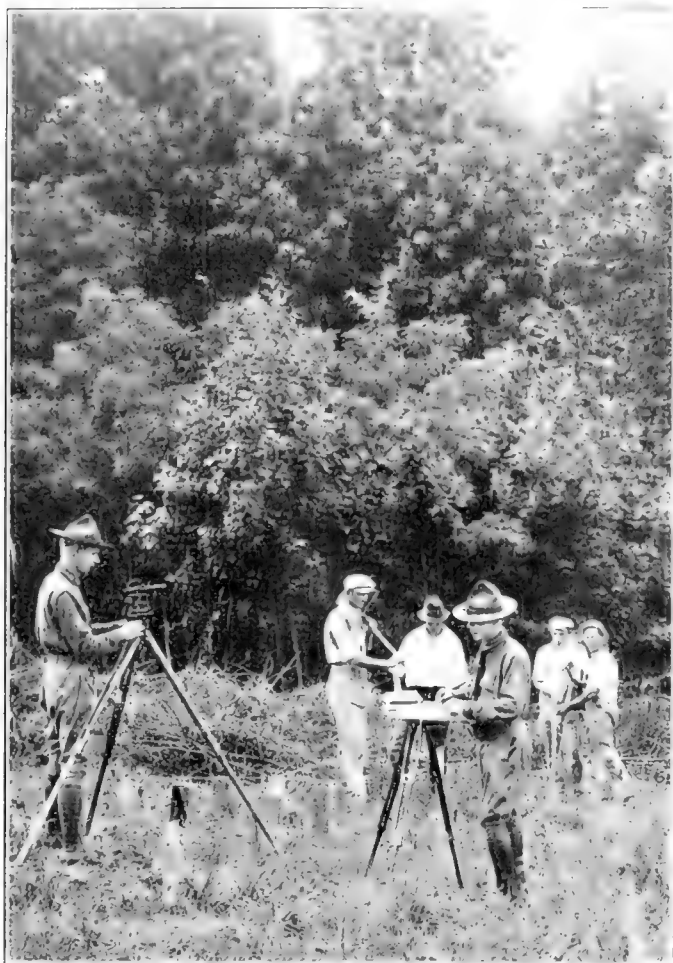


FIRST LT. JOHN B. WOODS
Of the Arkansas Land and Lumber
Company of Malvern, Arkansas.



FIRST LT. ROBERT L. DEERING
Forest Examiner, United States
Forest Service, stationed at Albu-
querque, New Mexico.

riding, straight-shooting lot of men, not only familiar with hardship and the life of the open, but particularly capable of looking out for themselves, by themselves,



CAPTAIN ELDREDGE AT WORK

Laying out the camp of the Tenth Reserve Engineers (Forest) on the grounds of the American University, Washington, D. C.

a long way from civilization. It was difficult to dissuade them from jumping into the fracas anyhow. The Mexican crisis passed, but then a bigger thing came along. District foresters wanted to get into it and said so; forest supervisors likewise, deputy supervisors the same, forest examiners and inspectors, ditto. Some did get into it, via the Officers Reserve,—witness Eldredge.

Foresters, from the very needs of their work, are red-blooded; they are used to doing things; they are accustomed to be where there are hard tasks to perform; naturally they are patriotic because their job is to look out for the "rocks and rills, the woods and templed hills." But counting only what may be called the least of their impulses, they have usually been where a good deal is going on; they didn't want to be out of the crowd where the most stupendous upheaval of the world was taking place. This may be no nobler spring of action than the one which prompts a man to go across the street to see a dog-fight, but to

those who have felt the urge, it was enough. Philosophers say fighting is a primal impulse.

With all these motives, plus the call for the defense of Democracy, the best way to hold the men of the Forest Service together, even though it be in France, was to organize a military unit of foresters. Mr. Graves became a willing convert to the call from the War Department; the organization of the Forest Regiment was undertaken forthwith, and Graves himself was prevailed upon to accept service with it.

One may ask, what are the foresters to do?

This can best be answered by a simple enumeration of some of the uses for timber, down to the smallest sticks, demanded by present-day warfare. Out in front of the very front line trenches are the barb wire entanglements stretched on wooden stakes driven into the ground. Three to five-inch round stuff with the bark on will do for these supports. Immediately in front of the trenches themselves, within arms' reach from the firing step, there are other stakes, projecting only a few inches above the ground. In the wall of the trench below them, footholds are cut and the short stakes provide a hand-hold to give ease and speed in climbing out when the order comes to "cross the top" and go forward on a charge.

A trench is not a simple, deep ditch. It has bastions and embrasures. It has advanced areas and recesses, all needing supporting timbers. What is apparently a slight mound in advance and to one side, is in reality a machine-gun dugout, with the gun so placed as to fire down a line directly in front of the trench itself, and all along the barbed wire. There is a cunningly built porthole, not high from top to bottom, but wide, at least at the outer opening, and narrow at the back or inner opening. Here a machine-gun spurts death fan-wise into the ranks of an attack. The frame work of this opening is made of logs.

Poles are in great demand, for field telephone service and for derricks and cranes in handling heavy loads. Bridge timbers are especially necessary, railroad ties are wanted, wood material for roads, repair lumber for transports, for field buildings and other construction work, all to be got out with the least possible waste and with the minimum damage to the forests. It will all represent a closer utilization of timber than most Americans have ever seen, even the smallest stuff going into fuel, and the tops into leafy screens for batteries. Eldredge and Bryant and the rest of them are getting pretty good practice in the camp construction itself. They have placed the barrack buildings at the American University grounds somewhat following the contours down the two sides of a slope or slight spur, upon the crest of which the main street lies, with the buildings running back on either side. On one watershed, divided by the spur, are the latrines; on the other watershed are the cook camps and mess buildings.

Most of the supervisors have directed similar con-



FIRST LT. RISDEN T. ALLEN
He is a member of the Allen-Medley Lumber Company, of Devereaux, Georgia.



SECOND LT. H. R. CONDON
Who was employed in the forestry department of the Pennsylvania Railroad.



SECOND LT. STANLEY H. HODGMAN
Logging camp foreman of the Potlatch Lumber Company of Potlatch, Idaho.



SECOND LT. JOHN W. SELTZER
Forester of the New Jersey Zinc Company of Franklin, New Jersey.

struction on their own forests, with bridges, lookout towers, ranger stations, and telephone lines. The materials of construction for these were taken right out of the woods on the ground.

The French timber will be taken out of forests of oak, beech, hornbeam, with some stands of pine; most of it is small—not over a foot in diameter. Since the forests are more nearly equivalent to the woodlot type of the Eastern states, it has been the aim of the recruiting officer to get the forces from the East rather than from the West, where woods workers are accustomed to handling larger stuff.

The men who will work this timber will be woodsmen. The officers are trained in forestry and lumbering and their task will be to see that the timber is efficiently manufactured and utilized. At the same time they are to make sure that there shall be no unnecessary destruction so that the forests will be left in the best possible shape for the future. The French forests have been painstakingly cared for, over many years, and French forestry has been an example to American foresters. Gifford Pinchot himself got part of his forestry training at Nancy, where the forest school has actually been under fire.

The men for the ranks are coming fast. Everard, back from New Orleans, his old home, reports plenty of applicants for positions as interpreters from the French population of that city. John Cobbs has been in the mountains of North Carolina; Kiefer in the big lumber camps of Michigan and Wisconsin; Reynolds is up in the Adirondacks, where he studied the fires of 1903, getting the plans explained to the lumberjacks there. Clifford Pettis, New York's state forester and one of the listing officers for the regiment, has been surprised and delighted with the type of men who

have applied for the rank and file—successful small mill operators and woods foremen,—men of ability in their fields of work and of standing in their communities.

Thus the enlisted men are picked woodsmen, and especial care has been exercised to get those needed for specific tasks. Ax-men, sawyers, tie-backs, skidders, teamsters, and blacksmiths have come in; millwrights, sawmill operators, engineers, filers, farriers, cooks and carpenters.

Reports now are that there will be six additional forestry regiments. This will give men like Coert DuBois and Redington, who have all along wanted to come in, the chance they have been looking for. All of the regiments, including this first one, will be under the direction of regular engineer officers, the "tie-hacking tenth," or the "fighting foresters," being organized and commanded by Colonel James A. Woodruff, Engineer Corps, U. S. A.

The foregoing, then, is a discursive sketch of the beginnings of the forest regiment. It does not give much in detail, and it leaves out many things that might go in. It mainly explains why Captain Eldredge, chigger-infested but cheerful, spent hot July days getting ready for a big undertaking and a most serious and necessary job, which will be attended with real risks, and will have its share of fire. The regiment is organized on military lines for military service, to be much in the thick of things, for that is where it is needed. Some of the fellows known to that great fellowship of foresters will not come back; but that is a hazard of war. At least, says Captain Eldredge, who claims to have read up on the subject, there are no chiggers in France,—which is his cheerful way of looking at the future.

**We see them go where barricades
Are builded of the trees they fell;
Leaf-screens against the air-craft raids
And log redoubts 'gainst screaming shell.**

**Where France's forests bleed for France
They toil with hand and heart and brain
To help the Starry Flag advance,—
God send them safely back again!**



THE MONARCH PINE

By LEON T. CHAMBERLAIN

Straight, and gaunt, and grim,
He stands on the canyon's rim,
And lifts his knotted arms
To the winter's mighty storms,
And roars as they rail at him.

As he mounted to the stars
Through a century of wars
With the winds—those bitter foes
Left the story of their blows
In a thousand ragged scars.

When the summer sun smiles down
On his royal, pinioned crown
His myriad needles sing
The love songs of a king,
And he smooths his battle frown.

In the warm, impassioned night,
With a thrill of keen delight,
His softest tassels sigh
To the nightbirds flitting by,
And the breezes' aimless flight.

Thus the Titan reigns alone
O'er a monarchy of stone,
And his paeans never cease;
Martial airs or notes of peace
Pour eternal round his throne.

RECREATION IN THE FEDERAL FOREST RESERVES

BY IDA AGNES BAKER

OUR vacation was a ten days' tramp among the foot hills of Mt. Baker, in the Washington National Forest Reserve; and "we" means two women who enjoy the woods and the out-doors and wished to begin a nearer acquaintance with old Koma Kulshan. We had no ambitions for dashing straight to his summit, as so many try to do. We wished to climb to a few of the outer courts, greet him afresh on each rise, see him in many moods and reckon with our own moods as well. We didn't care to join a big mountain climbing party. We hoped to be able to go alone. A crowd overwhelms sylvan life with its human chatter, but two people can quietly blend into the shadows and stillness of the forest life. This was as near as we came to having a plan when we started. Of course the fact that there is no recreation in tramping with a heavy pack on your back was a deciding condition in planning our trip.

On the twenty-fourth of July we went to Glacier with a party of thirteen students from the Normal Summer School, ready to climb Heliotrope Ridge. Glacier is a village at one of the gates of entrance to this Reserve. It is forty miles, by train or auto, from Bellingham and Puget Sound and nine hundred feet above the level of the sea. It exists just because

of the mountain. From it trails radiate to coal mines, gold mines, Forestry Lookout stations and mountain climbing stations. It lodges miners and mountaineers and summer guests, and it furnishes packhorses, packers and mountain guides. It sells food and post cards. Has a tennis court with a hotel, one street, a side walk that you risk your life walking upon, several pretty little homes and is a Forest Ranger's Station. It is surrounded by boiling grey-green glacial rivers, virgin forests and mountains and enveloped in air that is exhilarating.

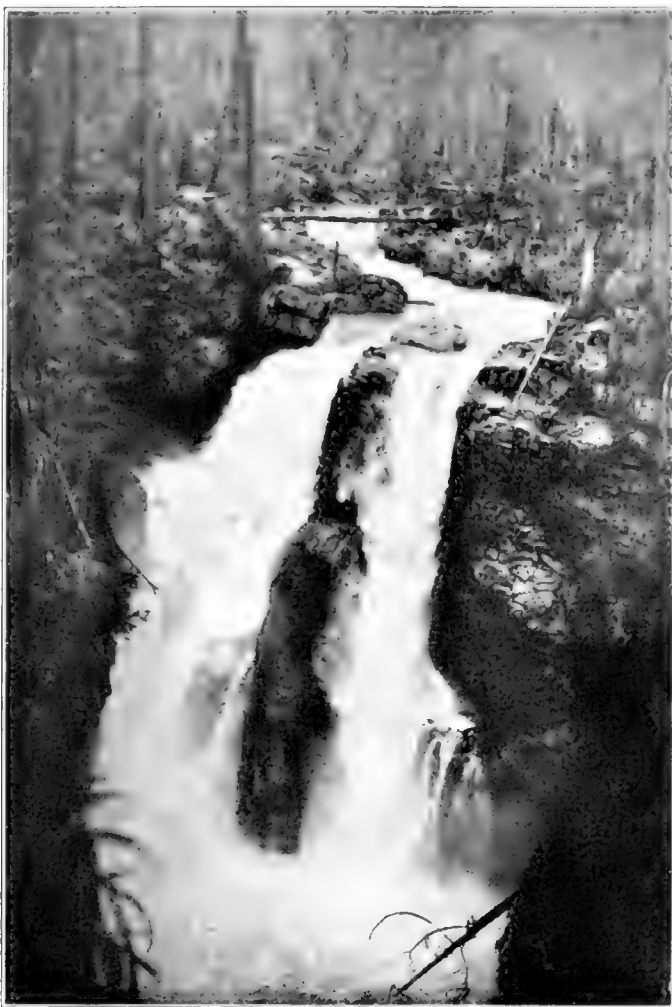
From here the party had planned to climb Heliotrope Ridge on Saturday and return on Sunday. We were going with them, but we had as yet no definite plans as to when we would return to either Glacier or Bellingham. Heliotrope Ridge is one of the stations for the Marathon runners who raced from Bellingham to Mt. Baker's summit and back. It is ten and one-half miles from Glacier and fifty-three hundred feet elevation and four miles from the summit.

The first nine miles of the trail is easy tramping, in the deep forest by beautiful waterfalls, over old burns and one treacherous slide. It was so surprisingly easy that my friends protested "there will surely be a day of reckoning." There was. The last mile



THE SNOW FIELD ON THE APPROACH TO MT. BAKER

The author and a friend spent ten days tramping in the foot hills around this fine mountain which is in the Washington National Forest Reserve



NOOKSACK FALLS NEAR MT. BAKER

A big water power plant utilizes the water of these falls to furnish transportation and light for Bellingham, fifty miles away.

and a half made us gasp, perspire and ache, and every few rods drop upon the ground—to enjoy the landscape. In the first mile the crowd broke up into twos and threes according to the pace they wished to take. Some of them made the trip in four hours, but we didn't. We took eight.

As we all started at 5:15 a. m. we slow ones had the last mile and a half in the heat of the day. Most of the women were dressed in the usual mountain suit. While I expected to be at the tail of the procession, I looked the crowd over at the start and decided that I, even I, would pass two of those girls laid out by the trail, for they had on long heavy woolen dresses. When, tired and hot, the last of the crowd, we reached the camp, there by the fire, as fresh as a daisy, sat the young lady of the heaviest skirt, tatting. On the threshold of old Koma Kulshan, to sit and tat! I was shocked. But I couldn't afford to be for she had already been in camp four hours. Time enough to meet the mountain, the glaciers, the flowers and get around to her tatting!

Heliotrope Ridge is probably a medial moraine in the great Roosevelt glacier. It is too close to the summit to give the most beautiful view of Mt. Baker,

but is an intimate view. From here the long precipitous snow wall, one hundred and fifty feet high can be seen very clearly. Our camp, under alpine firs and mountain hemlock, was on a bluff about fifty feet high that drops steeply down into glacial crevasses. We could see the blue ice of their depths, but the surface of the glacier here was brown with the boulders and soil that had fallen on it from the bluff. When night came we wrapped our blankets about us and lay down beneath the hemlock trees to rest and slumber. Those of us slumbered who had remembered hoods and extra hose, but the breeze from those vast snow fields drove the "foolish virgins" to the camp fire. The young people left the next morning. A packer had brought up the blankets and food for the party on two pack horses. As he was willing to carry our blankets back when he brought up another party we too decided to stay another day. On the ridge there were masses of blue lupines, white heliotrope, pink evening primroses and pink minulus and about twenty varieties of other flowers.

We slept another night upon the ridge, as comfortable and safe as the trees and blossoms among their snow fields. Nine o'clock in the morning, with a tin bucket of flowers to analyse and our lunch in our packs, we started back to Glacier. We dawdled on the trail, enjoyed every place of beauty to our fill, falls, outlooks upon the mountain, trees and flowers and reached the Glacier hotel in time for a hot bath and six o'clock dinner. The next day we analysed our flowers and made further plans. We decided to go to Twin Lakes, twenty-one miles distant, and five thousand and two hundred feet elevation, and after our return to climb Sky-line ridge. We didn't realize



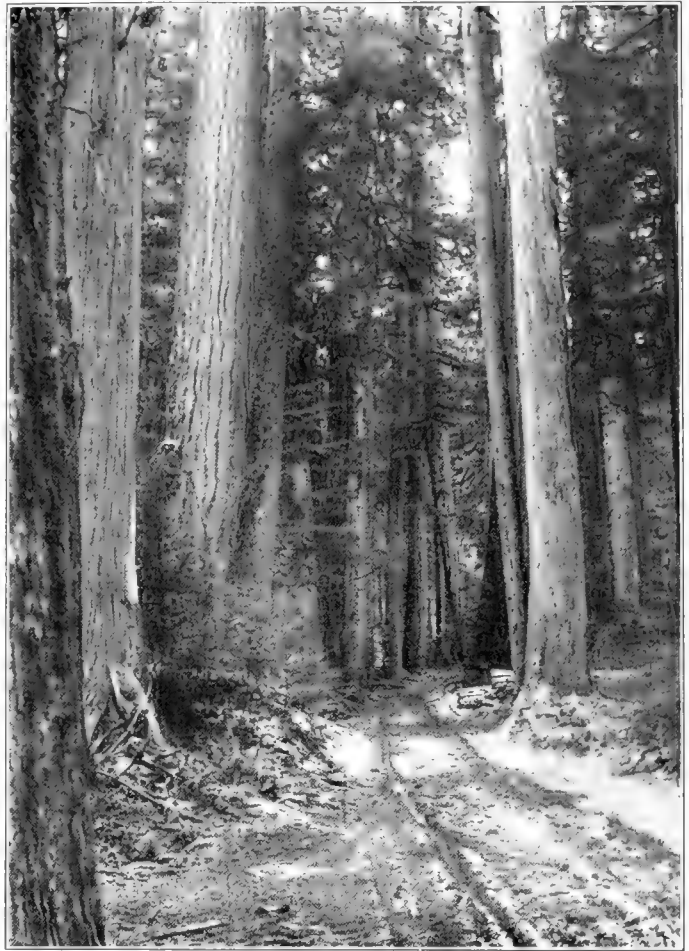
LOWRY'S CABIN AT HERMAN

The comfortable home of a miner at which the tramps stopped for a night on their way to Mt. Baker.

then that we were planning anything unique, but they told us afterward that we are the first women who ever tramped in this region alone. I know that in the southern foot-hills of Mt. Baker another friend and I have tramped to homesteads alone for thirteen years. There may have been early women homesteaders in this region, but we are the first women to start out from Glacier into the Reserve alone and just for the pleasure of it.

At 5:15 p. m., with packs containing face cream and powder, soap, towels, comb, tooth-brushes, one five-cent can of milk, one glass of dried beef, one loaf bread, some malted milk tablets, nut-meats, raisins, sweet chocolate, five sticks candy and three oranges we started on a three days' tramp; the first station to be at Excelsior, seven miles up the Nooksack river. I wore my khaki mountain suit and my friend a blue flannel blouse and bloomers. We both wore winter underclothes, woolen stockings, mountain shoes and carried our sweaters. My sweater was my only mistake—it was too heavy. At six we stopped by the river, a roaring mountain river, and ate our supper in the rosy afterglow of the sun sinking behind the black mountain ridges. We had phoned ahead and made arrangements to stay the night with the Dickson family at Excelsior. Mr. Dickson is manager of an electric power plant located at Nooksack falls. They and three other families that work for them are the only people living in this romantic place. The Nooksack river boils past their back porch and at high water rises up to the porch. A huge hill, a mountain, rises across the road from their front door. Everywhere there were great clumps of the red berried elderberry loaded with scarlet fruit.

It is an ideal place to live for with all this wildness and grandeur they had the comforts of civilization;



FROM GLACIER TO EXCELSIOR

The road winds through magnificent forests from the gate of the Reserve at Glacier, many miles along a plateau nine hundred feet above sea level.

lights in abundance, electric cookers, hot and cold water, bath, piano, graphophone, books, magazines and lovely rooms. I can't remember when I have had such refreshing sleep as I enjoyed this night. After breakfast Mr. Dickson took us over the plant where they make the force that furnishes transportation and light for Bellingham fifty miles away. The plant in no way destroys the picturesqueness of this spot. The walls of the valley are really mountains and the vast dimensions dwarf the buildings of the plant until they give just the evidence of human interest the valley needs. There are innumerable cascades and waterfalls in the Washington forests, but the Nooksack falls are not ordinary falls. The plant only uses one-third of their power. By a bend in the rock bed and wall the falls are half encircled and the sound of the falling waters in this huge bowl reverberates like the tones of a pipe organ. Far out on the rocky walls, in the mist, is a bunch of blue hare-bells and they will never be disturbed by men for until the water stops flowing no human hand can reach them.

It was nine when we started for our next stopping place, Herman, seven miles farther into the mountain. There are several shacks here, but only one is occupied. This is owned by a bachelor, a miner, who keeps a road house when he isn't off to his mine. The



ALONG THE BERRY BORDERED TRAIL

Miss Baker and her friend in their mountaineering costume on one of the trails on the approach to Mt. Baker.

forest ranger also uses it as a station, and since the owner was off to the mines, the ranger told us where to find the key and to help ourselves to anything we needed in food and pay when we came back.

We were in by three. We had loitered by the way, lounged by the river, cooked our dinner, picked berries, measured trees and estimated their board feet in our heads. We had neither paper, pencil nor tape measure with us and we wanted to estimate the lumber in one of the large trees among the cedars. I have tested and know that I can depend upon my nose to measure a yard. So, by relaying our two shawl straps, on which we carried the field glasses and marking stations we succeeded in measuring the circumference breast high. I have been estimating

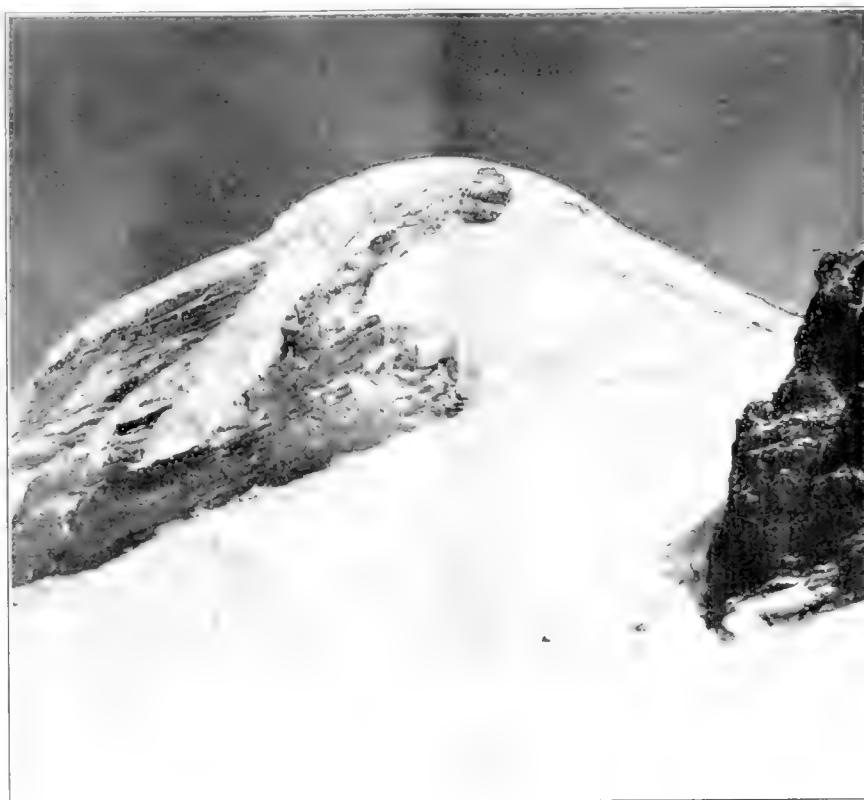
the height of the lowest branches of our firs and cedars for ten years so felt safe in saying it was one hundred feet to the lowest branches. While we stretched ourselves on the moss by the river, with these two dimensions, our arithmetic and forestry formulae, we mentally did our reckoning, proving our mental computations by comparing results. We found the tree to be a little over ten feet in diameter breast high and to contain over 65,000 board feet of lumber. A real school-ma'am-y amusement. It occurred to us to reckon how many homes could be built out of the tree, but we lacked data and it began to seem like work. However, I know that from such trees often only half of one cutting of shakes at the butt is needed to build a woodman's cabin.

The cabin at Herman is decidedly superior to the ordinary bachelor's cabin in the woods, and only a woods tramper knows how to appreciate these little homes in the woods. From the front porch we looked over the Nooksack river to the mountains. Ruth mountain, jagged, precipitous and yet snow covered, flushed in the light of the setting sun, was the center of the picture. I made hot biscuits for supper and since I could find neither lard nor bacon I made them

of carnation cream. They were fairly good, but extravagant for the woods. We cooked our last eggs, that is what was left in the shells, for I had dropped the bucket once. When Mr. Lowry is gone his cats keep house. There is a cat hole in the door. I love

a cat and was delighted to see them at first, but between the heat of the little room — we couldn't leave the door open because of the mosquitoes and the racket of the cats, we slept so little that we made a late start in the morning. When we came back I closed the cat hole and the cats slept in the open for once in their lives.

I have lived for weeks in the woods fourteen miles from a road, and the freedom from noises of civilization, — the silence of the forest broken only by the musical



MT. BAKER FROM HELIOTROPE RIDGE

The snow wall that appears to be about three feet high is more than one hundred and fifty feet high. A wonderful view of the mountain is to be had from the Heliotrope trail.

sound of rippling water or falling twigs, is very familiar and fascinating. Into this the ring of a telephone bell was as startling as a team of horses. But it was a very friendly sound when we heard the voice of Forest Ranger McGuire at Glacier asking how we had made the trip. The installation of the telephone is a long step in forestry towards closer protection of the forest. Trails, telephones and lookout stations are an absolute necessity in the control of fires.

After breakfast we started for Twin Lakes, six and one-half miles farther on and 3,000 feet farther up. It is the way to many gold mines and the forestry trail building crew of seven men were just completing a trail to the Lakes. They are far up among the peaks, two mountain lakes of exquisite blue shading from indigo to emerald, floating tiny ice-bergs, in places bordered by banks of icy snow, surrounded by slopes of snow and clumps of alpine flowers and trees and by huge buttes that framed the distant peaks of Red mountain and a magnificent view of Koma Kulshan.

The water from one lake empties into the other by little resounding falls and from this lake the water cascades down the mountain sides as Swamp creek. Even creeks have an individuality. This one is inter-

laced with moss covered logs and stumps in place of boulders until it seems to be trickling through a swamp of greenery. It is a fine trail and the climb on easy grade until you reach the last two miles. Nothing could make that easy—owing to our late start we made it between eleven and one, and the day was hot. Only climbers know all that means. Then is when you grieve over every ounce of avoirdupois you have permitted yourself to acquire in the last ten years.

Fortunately we had left our packs and sweaters and had only our field glasses, pail and lunch to carry. We were thoroughly weary when we reached the summit, but the view was worth our pains over and over again. All my life it will

“Flash upon that inward eye,
Which is the bliss of solitude.”

Our only grief was that we had no blankets and could not stay all night and then climb the buttes. I think we could have seen the world from their summit. We rested and explored for two hours and then started back. The trail building crew were within ten rods of the end when we met them. As they eagerly asked how near they were to the top it was a delight to cry, “The next turn will show you the lakes.” It is sort of dramatic to be in at the finish of any thing, especially when that thing is a trail to cloud-land. When we returned to the camp for our packs the cook gave us some bread just from the oven to take with us and a slice of hot bread and butter, the best I ever ate.

Picture a bit of meadow land, a white tent and a fly; under the fly a table, stove, little cook stand and cupboard, benches, a rollicking baby of eight months on a blanket on the ground, and a bright faced young lady in overalls, and you have our cook and camp. Her husband is foreman. The Ranger sent out horses the next day to move their camp to the Hannigan Trail. On one of them she took her baby and rode to the next station thoroughly enjoying the primitive life. These people understand trail building. There is all the difference in the world between trails. After you have felt of eighty miles of trail with your feet and packed and panted over them you know that you are capable of having opinions concerning trails. His trails make the most elevation with the lowest grade of any I have ever trod.

On Heliotrope Ridge trail, which was not built by the Forest Service, you do so much going down when you are going up the mountain and so much going up when you are going down to Glacier that my friend suggested that perchance we had lost the mountain and were going back. Unless he reaches some special point of beauty by the down grade, the provident climber groans over every loss in elevation. We reached Herman at seven p. m. and spent another night in the cabin. Rising at half past four we had breakfasted, put the cabin to rights and were on the trail by half past five, too early for the flies.

I never saw so much wild fruit as there is on this trail. We counted thirteen kinds of edible berries, quantities of blue and red huckleberries, salmon berries, thimble berries, red, yellow and black raspberries, blackberries, red elderberries, Oregon grape, silal and two kinds of wild currants. For miles it is one vast berry patch. We picked and ate. I thought for once I would have all the thimble berries I wanted and one can hardly resist the red huckleberries because they are so pretty. We reached the Dickson's by eleven, had dinner and visited until three, then started to Glacier. It was a warm day and we had enough left in our packs for supper so we planned to reach the hotel about eight. It is the easiest thing to loiter in the Washington woods by a mountain stream. While it was still warm we took a nap on a bluff that was deeply cushioned with moss and embroidered with twin flower vine and bunch berries. It was more comfortable than most beds. We were screened from the road by red huckleberry bushes loaded with their coral colored fruit. A hundred feet above us the firs, hemlocks and cedars held a canopy of green over us, their trunks like great pillars. At one side the grey-green river boiled below us and on the other the mountain rose steeply out of sight. The haze from forest fires had filled the air, the sun was red in the sky and the yellow light gave the effect of seeing the world through colored glass. While we rested and lounged we saw two men go down the road with packs on their backs, prospectors probably, coming out of one of the mines.

On a tramp like this you meet few people and every one has a personal interest. On the Twin Lakes trail, besides the trail makers, we met a jolly old assayer going to one of the mines. He had a charming German inflection, and his stories as we rested and chatted were delightful. One story told was how one winter they worked a mine all winter and there was so much snow that every morning they had to climb on the roof and put on another joint of pipe. In the spring their pipe was “up in the air,” and somehow his chuckle gave you the impression that the pipe wasn't all that was up in the air.

The first day on the Shukson trail we met the Ranger and received kindly directions. These, with the packer I mentioned before, and the Excelsior folks were all the people we saw on that three days' tramp. The loneliness is what we enjoy. Sometimes we walk long distances in Indian file and Indian silence through those still forests thoroughly happy. Every forest incident is an event on the trail, a familiar or a new bird song, a change in the trees or the flowers, a dip in the trail, a break in the woods that frames a mountain peak or a ridge, a miner's shack, a sign board and trails, those composite imprints of living feet, turning off among the tree shadows, a bit of meadow, a burn, a slide, the deep breath of exhilarat-

ing air, the joy of a weary climb accomplished, a seat on a log and renewed study of the map, lunch by the brook.

There is no use in describing it to those who enjoy it for they know already and there is no use for those who are puzzled over it for they never can know. We reached the hotel by half past eight, dusty and footsore and luxuriated in the hiker's delight, a hot bath and clean cotton sheets and night clothes. If summer outings do nothing more they make one realize the luxury of ordinary comforts of civilization. We rested and analysed flowers a whole day, then climbed Sky-line Ridge, one of the forestry lookout stations. The forestry crew built this trail the spring of 1914, and whenever there is a lightning storm the Ranger sends a man up to look for lightning fires. The outlook is vast and wonderful, but the thickening haze hid most of it from us. There is hardly a foot of lost elevation on this trail and yet it is a stiff climb. It rises 5,500 feet in five miles.

We started too early for hotel meals and prepared our three meals ourselves. We had breakfast down by the brook on hot coffee, boiled eggs and hot toast and were on the trail by half past five. Nevertheless, noon found us on the snow meadows, whence all the snow was gone, and the only signs of the trail far apart blazings. By having one of us stay near a blazing until the other had found the next one we plodded up over the slippery, grassy, flower-bedecked, hot meadows until we reached the lookout's tent. The springs on the trail are not perennial and there was only one place where we found water. When we reached the ridge above the tent the world was veiled in a smoky haze. Only the bare outlines of ridges and mountain peaks hinted at what we would see on a more auspicious day. The ridge is a succession of meadows outlined by alpine firs and hemlocks, brilliant with blue lupine, white heliotrope and buttercups, but so much alike that we soon realized that, surrounded by this haze like a fog, it would be very easy to lose the tent and so the trail. This checked our exploration of the ridge. We missed what we came for, but nevertheless it was worth while, the trail itself, the meadows and flowers, the lookout station, the geography of the ridge were all interesting enough to balance the fact that it was a hot, weary, dry and resultless climb.

We had lunch without water on the meadows. These lunches are always simple on the summit for obvious reasons. We had dinner down by the river again about a mile out of our way. We started to Heliotrope Ridge, taking a plate, knife, spoon, cup and bucket, the simplest of culinary outfits. We had this last meal with hot coffee, the one utensil, a cup apiece. We left our plates and knives with our bedding at Heliotrope Ridge. We had lost the penknife on the trail so we broke our bread. As there were no new flowers on the summit I left the bucket at the Outlook tent, forgetting about supper. We built a

tiny fire and made coffee in our tin cups. We spread butter on our broken bread with flat pebbles, stirred the sugar in our coffee with dry twigs, divided the orange, and nutmeats, raisins and candy and with our hot coffee and toast, by the boiling river under the fir trees in the afterglow of a dusky twilight, ate our last luxurious meal. Thus you can simplify the simplified.

We reached the hotel long after dark, after our longest one-day trip, seventeen miles, and in the morning, after eight miles of tramping we took the auto stage for a forty-mile ride out of the foothills to Bellingham.

SCRAPPIN' FIRE ON TH' CHEROKEE

By H. L. Johnson

I RECKON she's swiped th' whole durned thing,
From Oswald's Dome down to Clemmer's
Spring."

"Naw, 'tain't that bad," says a little feller,
"Our gang stuck to 'er an' never showed yeller.

We cut her off twixt the' prongs er th' crick,
An' saved th' south end,—Lord but I'm sick.
Let's stop here an' drink, who's got a chaw?
An' who's ever heerd of th' eight-hour law?
Here, take yer blamed ol' busted hoe,
I've toted hit round 'till I dunno
Ef I'm able ter git back home 'fore day.
Wonder when we'll git our pay?
No grub sense mornin', sucked water like a bee
Now fire's jes played H—— on th' Cherokee.

"Jeff, you take the lead an' the rest'll foller,
COURSE I KNOW THESE WOODS, ev'ry lead
an' holler;

But I'm fair to admit, I'm a leetle mixed,
LORD a' mighty, now I'm fixed.

Huh? Oh nothin' tall, keep peggin' ahead,
Stumped my toe, an' was dreamin' uv bed.
This looks a heap like makin' a crop,
Us scrappin' fire, an' it ain't rained a drop
Sense week 'fore last when they cut th' still,
Back er Fate's house and busted his mill.
A fool that'll grind malt in a coffee machine,
Is sure ter git ketched ez soon ez it's seen.
Huh? Naw, thet FOREST FELLER can't hear,
or SEE,
All he knows is scrappin' fire on th' Cherokee.

"Whoa, hol' on, ain't that a light,
A man gits blind in a fire fight?
Yep, thank the' Lord it's Greasy Crick,
Git up ol' woman, my skull's too thick
Ter figger how we made it back,
SURE it's me, git up an' cook a snack
Er grub, (come in men), for these fellers
Ter eat as they go, that boy bellers,
Jes' as soon as he hears his Pap,
Here SON, set up here, on yer ol' Dad's lap,
An' keep out fum under yer Maw's feet,
Till she gits suthin' fixed fer the men ter eat.
Now men, set right up an' EAT, it ain't no spree,
This scrappin' fire on th' Ol' Cherokee."

THE NEW FREEDOM-OF FOOD

BY NORMAN C. McLOUD

A COMPOSITE photograph of the homes of America at the present moment would show the national family busy with Food Conservation in its most practical and most profitable form. The work of providing a food supply for winter is under way in every part of the land. The Canner and the Drier have taken a place of new importance in the household. They have become the symbols of the new domestic freedom—the American citizen's Declaration of Independence against the high prices and food shortage of winter which must inevitably result from food waste in summer.

More than three million home gardens are reported by the National Emergency Food Garden Commission. This is triple the number the Commission undertook to inspire through the campaign of education and stimulation conducted throughout the early spring in conjunction with the Conservation Department of the American Forestry Association. If but one million gardens had been planted the Commission would have felt that its work had been well done and its reward complete. With three million and more of these gardens flourishing within the borders of the United States the Commission feels profoundly gratified and at the same time recognizes new responsibility. In discharge of this obligation it is devoting its energies and machinery to a campaign of Home Canning and Home Drying. All reports indicate that this movement is meeting with the same overwhelming success that attended the campaign for home gardening.

Food Thrift is the watchword of the undertaking. Through every agency at its command the Commission is urging upon the people of America that the utilization of 100 per cent. of the nation's food supply is the patriotic duty of the individual citizenship. As the basis of this gospel of thrift Home Canning and Home Drying



THE END OF A CANNER'S DAY

If you should ask this girl's mother you would probably find that it was the end of a perfect day as well, for sunset found the young lady surrounded by the cans which she had filled since morning, without help. Why not take this home and try it on your canner?

WILL THIS JAR CAN MASON

FROM our constant daily reading we can see the thing we're needing is the stuff for fully feeding folks at home and folks afar. For the daily papers tell us facts and figures that compel us to be wide-awake and jealous of the waste we should debar. Bread and butter, beans and berries, kraut and cabbage, cheese and cherries and the eggs of Tom and Jerries should be saved throughout the land so that ours, the fruitful nation, may prevent the quick starvation of the balance of creation in the troublous times at hand. Though it seems inconsequential each small slice of bread's essential to keep famine pestilential from ourselves and our Allies; waste of food is unpropitious, un-American, pernicious, and has consequence as vicious as a swarm of German spies. All our logic and our reason prove it's nothing short of treason if we let the growing season find us idly looking on, not considering nor caring for the famine which is staring in our faces, nor preparing for the days when summer's gone. Let us then do what we ought to, by devoting all our thought to saving food-stuffs as we're taught to by the manuals complete which the National Commission has prepared in large edition for improving the condition of our stock of things to eat. This is something worth your trying, for by canning and by drying all the things that you've been buying you'll not merely feed yourselves, but you'll find, from the beginning, that you've helped our troops in winning by the drying and the tinning which have stocked your pantry shelves.

Manuals are being distributed by hundreds of thousands. These booklets embody the wisdom and counsel of the foremost research workers of the United States. Men and women who have devoted years to the improvement of methods for home canning and drying have contributed to their compilation. In simple terms and plain language, devoid of technical complications, the manuals make it possible for everybody to can and dry vegetables and fruits at the lowest possible expense and with the greatest possible measure of satisfaction.

In addition to these publications the Commission has the co-operation of nearly two thousand newspapers from coast to coast. These papers are publishing daily lessons in canning and

drying prepared by the Commission's experts. In this way the instructions given in the booklets are supplemented by continuous suggestions and helpful hints which keep the homes of America constantly reminded of the importance of food saving and intimately informed as to every possible detail of the canning and drying pro-



RADISH HARVESTERS AT WORK

Suppose you were one of these boys and had found more fun in planting and weeding your radish patch than in stealing away to go fishing; and suppose when harvest time arrived you found that you had bushel after bushel of radishes five inches in length; and suppose the market was eager to buy such vegetable treasures. Wouldn't you feel proud of your summer?

cesses. Co-operation of similar force is being given by magazines and other periodicals of national influence which are making liberal contributions of their space and the talents of their staffs in spreading the propaganda of food thrift.

That such thoroughly organized work should be reflected in the nation's food situation is inevitable. The people of America are aroused as never before to the importance of Food Thrift and Food Conservation. Interesting measure of this interest is afforded by the vast demand for the canning and drying manuals issued by the Commission. Since early in June this demand has been growing in volume. Beginning with a few thousand a day the requests for the booklets increased at such rate that July brought the average up to 25,000 or 30,000 daily. These requests have come from every state in the nation and from every part of every state. They have come through every possible channel—from hundreds of thousands of individuals ranging from the day worker to the wife of the railroad president; from local canning and drying clubs, from organizations of all kinds, from schools, colleges and universities, from libraries, from state educational departments and from city, county, state and federal official sources. Members of Congress and United States Senators have been procuring the booklets in large quantities to distribute to their constituents. The employees of the Treasury Department have received official notice on the department bulletin board, advising them to avail themselves of the Commission's offer to

supply the booklets upon request. Some branches of the Federal Government have placed the seal of approval on the work of the Commission by adopting the manuals as standard. In the department of the Interior Indian Commissioner Cato Sells requested and received enough manuals to supply the Indian schools throughout the country. The Public Health Service provided the booklets for all of its marine hospitals which have gardens and the Department of Commerce supplied them to its lighthouse service. In short, the manuals have been given recognition by the most important private, social and official agencies and have gained currency that has afforded profound satisfaction to the public-spirited men who have made this a part of their contribution to the national emergency.

As was the case in the home gardening campaign of the spring and early summer, the headquarters of the Commission have come to be looked upon as a national center for activities along the line of Food Thrift. The daily mail at the offices in Washington requires the maintenance of a large staff in addition to the employees whose time is devoted to the work of complying with requests for manuals. Thousands of questions are submitted for expert attention. These are met with the same ready response given the applications for the booklets. The Commission has made itself a clearing house for information on various lines of food saving and food utilization. Through these activities the nation has received constructive and practical counsel on every phase of food production, food canning and drying, the storage of vegetables and fruits in their natural state, the economical use of all food products and the urgent need for preventing the waste that has played such an important and grievous part in American practices.

The new importance attached to canning and drying this year has two fundamentals. Primarily it was never so essential as now that no foodstuffs should be allowed to go to waste. The world needs everything that can be produced. Closely related to this underlying truth is the tremendous harvest of the home garden area. Even when the production is no more than normal the growing season creates a supply far greater than the immediate demand. For proof of this one need consult no statistics. All of us are familiar with the waste that takes place in garden and orchard. It does not require a large garden to produce more foodstuffs than the family of average size can possibly consume. As a result much of the crop is wasted. It is all too common to see tomatoes going to decay on the vines because the supply is beyond the household appetite. This is similarly true of various vegetables grown at home. At least 20 per cent. of the sweet potato crop of the Southern States goes to waste for lack of demand. Millions of bushels of apples are allowed to spoil in the orchards because a glutted market will not take them at prices that will pay for harvesting and transportation.

This overplus of the growing season must be viewed in one of two ways. It is obvious that we must look on it either as a mistake of nature or as the manifestation of

a deliberate purpose on the part of an all-wise Providence. No alternative is possible. There is no middle ground. If we choose to regard it as nature's miscalculation it is logical that we should be willing to sit by complacently and make no effort to correct the apparent

home drying furnish the inevitable answer. Through these activities only can we obviate the prodigious waste with which an abnormal garden crop threatens us. In no other way can the abundance of summer be made to supply the needs of winter. In no other way can we

insure ourselves the full worth of our food supply. If we fail we cannot comfort ourselves with the thought that nature was in error and that no responsibility attaches to ourselves. The burden is on us. We can but feel that the mistake was our own and that we have only ourselves to blame for the food shortage, and high prices of the winter.

Food thrift, therefore, has a double meaning. In its larger sense it is a duty of patriotism. To the individual it is a means of providing a winter food supply at a minimum cost. As a patriotic measure it is a vital factor in enabling the United States to fulfil its obligation in the matter of overcoming the food shortage of its allies in the great European conflict. Every pound of vegetables and fruits stored away on the pantry shelf will be a factor in solving this problem. By decreasing the need for winter purchases these home stores will augment the amount available for the feeding of our own soldiers in



DID YOU EVER SEE SUCH A TURNIP PATCH?

What better argument could be offered in favor of Home Gardening than this picture of a prosperous turnip patch at the time of harvest? These boys knew what they were about when they undertook the job of making a garden and they stuck to it like a shoemaker to his last. The result speaks for itself, but in this case virtue has a reward in money as well as in itself.

error. On the other hand if we use our reason we know the trenches and for supplying the needs of the domestic population of the countries which are

that nature makes no mistakes. With this as our basis we are brought to the conclusion that the forces of creation wrought wisely and well in giving mankind of their abundance. We are brought to the realization that it was no part of nature's plan that any of these products should go to waste. Nature is the true Conservationist. The most elemental observer knows that she never miscalculates and never wastes, as witness the transformation of prehistoric forests into today's coal supply. The materials she cannot use in one form go through her laboratory to be transmuted into another. With this example of thrift constantly before us we cannot fail to recognize our own responsibility as to the food wealth of the summer. Our duty is clear. This wealth was given us for a distinct purpose. To achieve this purpose we must practice food thrift on a national scale. Home canning and



SUFFRAGE NOTE: BOYS EARNING THE VOTE

The man is teaching the boys how to utilize fruit products by home canning. That they were apt pupils is shown by the statement that on the day the picture was taken these lads put up an even thousand cans of fruit by the cold-pack process. Mothers and sisters please give credit.

helping us in our fight for world-wide Democracy. In this way canning and drying are vital to victory. By

thus providing for our own food needs we are making possible an adequate provision for preventing starvation in Europe. In no other way can we be so helpful in the great war. Our armed forces will do valiant service, and our money and munitions will be of tremendous worth in crushing the foes of freedom; but in the final analysis it is in the matter of food that we can be of greatest use.

As an individual benefit the saving of food by canning and drying has direct appeal for every household in America. Experience has shown us what it means to go into the winter with nothing laid by for the table. An empty pantry or storeroom means that the household must look to the grocer for its supplies. Each day's eating becomes a problem in finance. The can of tomatoes purchased in February involves the payment of tribute to the various agencies concerned in its production and handling. The consumer pays cost and profit on every stage of the process, from the time the vegetable leaves the vine until it has passed through the hands of the dealer, the canning factory, the transportation companies, the warehouse, the wholesaler,

grower. In view of this common prudence demands that the individual do away with the chain of middlemen and absorb the various costs and profits for himself. If you



WHAT A COMMUNITY CAN ACCOMPLISH

There is no better way to engage in canning and drying operations than by forming community clubs, to conduct the work at a common center, such as a school house. This picture shows a gathering at a rural school, making a business of providing vegetables and fruits for the winter. Every family within three miles is represented.

have raised your own garden truck your problem is all the more simple. By Canning or Drying all the vegetables and fruits that can be spared you reap the benefits which otherwise would accrue to everybody from grower

to retailer. You pay tribute to none of the agencies concerned in winter preparedness, but go into the months of non-production with a sense of profit and independence obtainable in no other way. If you have no home garden your duty to yourself is no less imperative. By Canning and Drying you avail yourself of purchases at the time of greatest plenty and with prices at their lowest ebb. By failing to take advantage of this opportunity you will be forced to buy when there is none of the competition of the growing season and when prices are at their highest level. The conclusion is so apparent as to require no argument.

The need for Food Thrift neither begins nor ends with canning and drying. It must be made the every-day of household routine. The essence of it is that nothing should be allowed to go to waste. The food that is left over from one meal should be prepared for the next.



TEACHING THE CANNING AND DRYING TEACHERS

Stimulation of canning and drying activities always follows the formation of clubs. These people are club leaders who have gathered at the county seat to receive instructions from experts. From this meeting the leaders return to their own localities and instruct their neighbors at club gatherings where the actual canning and drying is done.

the jobber and the retailer. All of these agencies must exact their share of the selling price and by the time the can reaches your kitchen it represents an investment that bears no relation to the sum originally realized by the

canning and drying. It must be made the every-day of household routine. The essence of it is that nothing should be allowed to go to waste. The food that is left over from one meal should be prepared for the next.



MODEL FOOD GARDENS AT SOUTH BEND, INDIANA

These gardens are planted and cultivated by the employees of the Oliver Chilled Plow Co., which provides the land for them and aids them to make the garden successful. Similar co-operation between employer and employees in many sections of the country has resulted in thousands of acres being planted and many thousands of dollars worth of vegetables being raised.

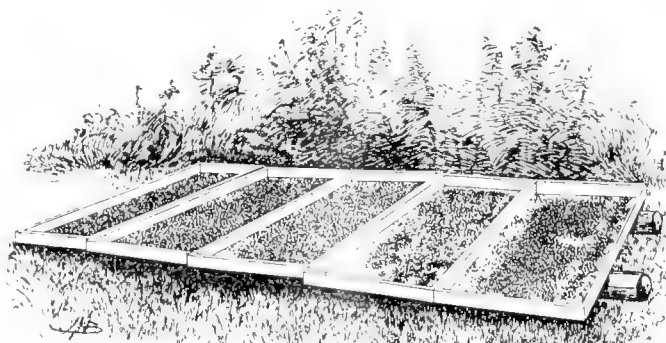
In this way we should follow the example set for us by nature in her unwillingness to allow waste to enter into her scheme of operation. Every American home should become a laboratory for the transmutation of food surplus into food values. In this undertaking we have a distinct advantage over nature, in that no loss of time is involved. To change forests into coal takes generations. Even the conversion of vegetable matter into enriched soil is a slow process. Food saving, however, is a matter of the moment and involves no loss of time in waiting for results. It can be accomplished so quickly and so easily and its benefits are so definite that one wonders why a world war was needed to bring us to realization of its advantages.

This country has been notoriously extravagant in the use of its food supply. The British army in France and a large portion of the French army as well could live comfortably on the food which has been allowed to go to waste in America from year to year. This annual waste is estimated at \$700,000,000 and this figure is believed to be too low. Be the amount what it may it is appalling and inexcusable. Translated from dollars into concrete and definite possibilities it means that sheer recklessness in the matter of food destruction might easily

wipe out all hope of success for America and her allies in the European war. To win the great conflict we must defeat the domestic enemy—the wanton waste of our foodstuffs.

Much of this waste may be prevented in the home. The natural thrift of the housewife must be given enthusiastic support by the entire family. We must overcome the idle prejudice against warmed-over dishes. If the ruler of the kitchen takes the trouble to prepare in tasty form something left from a previous meal we should marvel at her skill and show our appreciation of her resourcefulness. Sarcastic comments on the re-appearance of yesterday's dinner should be punishable by fine and imprisonment for grown-up offenders, and by adequate application of the corrective slipper to those of more tender years and anatomies. In short, we must all do our share to encourage the housewife in the practice of thrift in the use of her food supply.

Each of us has a responsibility along the line of making certain that nothing edible is thrown away. With military authorities agreed that the outcome of the war is a matter of food supply, every food saving, trivial and unimportant as it may seem of itself, adds to the aggregate of the supply which must be available if victory is to be made cer-



LETTING THE SUNSHINE DO YOUR WORK

The simplest form of vegetable and fruit drying is to spread the slices in the sunshine. The trays here pictured are made of light wooden framework with galvanized wire netting. By having the trays raised two or three inches above the ground air circulation is provided.



YOUTHFUL CANNERS SEE IT THROUGH

The woman at the right is an instructor in home canning operations. She is teaching a group of future housewives the cold-pack method. The various steps are pictured. With vegetables or fruits in a piece of cheesecloth the instructor dips them into hot water, for bleaching. The first girl removes the skins and cores. The second girl puts the vegetables or fruits in jars. The third adds syrup or water, as required, and puts rubbers and tops in place. The fourth places the jars in sterilizer and watches the time.

tain. As an example of the appalling figures reached by seemingly slight waste a single slice of bread affords a startling total when multiplied by the aggregate of American homes. Considered individually a slice of bread does not amount to much.

In many households it is no uncommon occurrence for a quarter or even a half a loaf of stale bread to be thrown away as having outlived its usefulness. Let this take place in every home in America and the loss is prodigious. A fair-sized slice of bread weighs an ounce. To produce it has required the use of three-quarters of an ounce of flour. If each of the 20,000,000 homes in America should waste an average of a single slice a day it means that in the aggregate the country is throwing away daily over 14,000,000 ounces of flour—more than 875,000 pounds. This is enough flour to produce over a million one-pound loaves. In a year it means the throwing away of over a million and a half barrels of flour. Figuring flour even at \$15.00 a barrel this involves an annual loss of \$22,500,000, all of which arises from the waste of one slice of bread a day in every household in the land.

The worst of it is that no one can deny that these figures are an underestimate rather than an exaggeration of the bread wasted in American homes. Can anyone claim that the loss is justifiable? The cure is simple and is

in the hands of every household.

The number of ways in which stale bread may be worked over into appetizing dishes is so great as to make it possible to prevent this loss without sacrifice of the family's enjoyment of its daily bill of fare. The same reasoning applies to a thousand and one varieties of leftovers. Cereals uneaten at the morning meal may be combined with meats, fruits or vegetables to make appetizing side dishes for luncheon or dinner. Even so small a quantity as a spoonful of cooked cereal is worth saving as a thickener for soup or gravy. Even the water used for cooking rice and many vegetables may be used to advantage in the preparation of appetizing and nourishing dishes. Skim milk contains all the nourishing qualities of milk except fat. Sour milk may be used to advantage in baking and in other forms of cooking; meat and fish scraps add flavor and nourishment to made-over dishes and fat can be tried out



SOME LUSCIOUS TOMATOES

These are now grown by experts who advocate six foot poles for the vine so that the fruit will be exposed as much as possible to the sun.



BOYS CAN MAKE THEMSELVES JUST AS USEFUL AS GIRLS

Just because a boy is a good baseball player or a mighty fisherman there is no reason why he should let his sister have the advantage of him in this time of Food Thrift. These boys have developed themselves into expert canners of vegetables and fruits. Their interest arose from the success of their home gardening work. After raising a thrifty crop they saw that in order to get the most good out of it they must prepare a large part for winter uses. Manly pride made them unwilling to call for feminine help so they did the canning themselves. This gives them the satisfaction of knowing that the food-stuffs are of their own creation from seed to jar.

and used as a substitute for butter and lard in cooking.

Nor is the use of leftovers the only duty of the household. There is probably as much waste through spoilage as through throwing away. To prevent this food supplies should be carefully guarded against exposure to heat, germs, dirt and flies. Mice and insects should be treated as alien enemies and kept away from the restricted zones in which the household larder is located. Vegetables threatened with decay should be put to use immediately. If the use is not apparent it should be found. Fruits on the verge of spoiling should be stew-

THE HOME GUARD IS WORKING

THERE'S something doing in the land. You'll find the signs on every hand. There's something in the air. The folks have formed a kitchen guard and everybody's working hard; they're busy everywhere. And what I like about the bunch is that they've got the proper hunch about the things we'll eat. They're canning corn and peas and beans, they're drying pumpkin, squash and greens, they've got the food game beat. They're canning everything they can, to please and feed the inner man and keep the wolf away. They're drying stuff in wholesale lots and taking steps to knock the spots from winter's rainy day. They've viewed the mammoth garden crop and vowed that they will put a stop to all the waste of food that's taken place from year to year and made the winter living dear for every household brood. No more we'll see tomatoes fine decaying on the fruitful vine, nor apples on the trees; no more we'll see things lie and rot within a fertile garden spot while mother's out at teas. For every woman in the town has dressed herself in kitchen gown and works with all her might to can and dry the things she'll need her hungry family to feed, with winter days in sight. The girls have taken Mother's cue, and Dad and all the brothers too have set themselves to work, because they know that war-time thrift must be the patriotic gift which none of us may shirk. They know the nation must provide the food that's either canned or dried to fill the household stores in order that the stuff we've raised may make our country's name be praised on European shores; they know that we must feed the troops in many million numbered groups that they may win the fight; that they may win their battle brave, the Democratic flag to save, and thus maintain the Right.

ed and held for future use. Of similar importance is the necessity for cooking appetizingly. Even patriotic duty is subjected to a strain when oatmeal is scorched, potatoes improperly seasoned or soggy, vegetables poorly flavored or meats and fish overcooked. The cook who uses care to make dishes palatable is rendering a national service this year, just as truly as the soldier in the trenches.

One of the most gratifying phases of the war-spirit is the enthusiasm with which the people of America are responding to the need for food thrift. This response is general, genuine and unstinted. Its influence on the food problem of the nation will be tremendous. By canning or drying everything that can be canned or dried and by practicing food thrift in every-day living the individual household will be making available a vast food supply that will prevent starvation in Europe. Every pound kept from

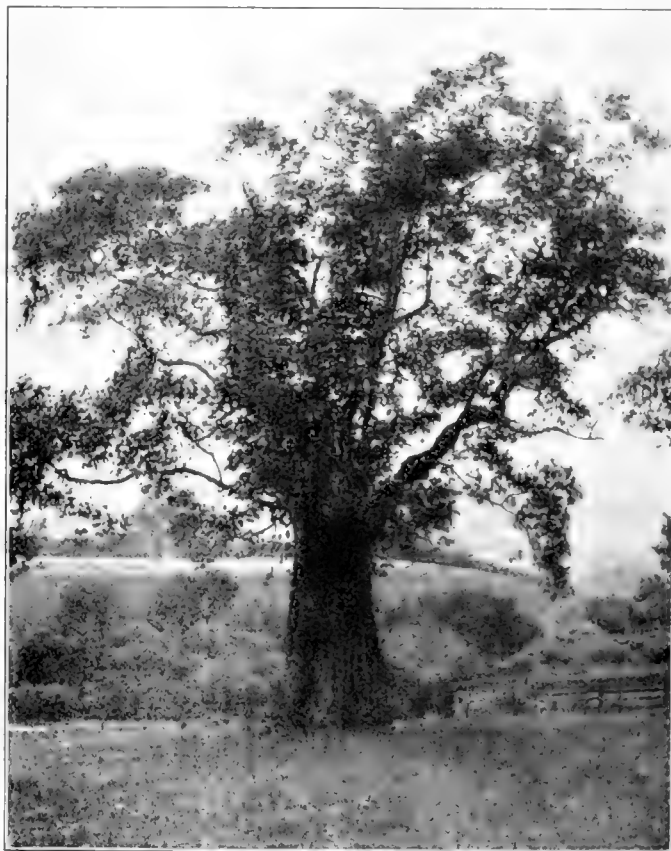
going to waste augments the amount of food that can be spared for export. By providing its own winter stores through canning or drying the household reduces the demands which it must make on the open market. Everything stored on the pantry shelf or saved from waste is a factor in releasing other edibles for transmission to war-ridden Europe. Conservation thus becomes a distinct service to the nation and to those who are engaged with us in the fight for Democracy. Its practice is a patriotic duty and in this time of war no true American can afford to do less than his full share in bringing about 100 per cent efficiency in the use of the foodstuffs with which nature has rewarded the labors of the Soldiers of the Soil.

To encourage, stimulate and render easy the practice of food thrift through Home Canning and Home Drying the National Emergency Food Garden Commission is bending its every energy and resource. In the various ramifications of the undertaking the Commission has had in mind the one vital fact that a nation at war is a nation with a food problem. This problem is fundamental. Its solution is essential to success at arms. With all Europe aflame, her fields devastated and fruitless and her population engaged in the pursuits of war, America is confronted not merely with the obligation to feed itself, but to feed its allies as well. The world supply of food is abnormally short. If victory is to be achieved in the battle for democracy America's food wealth must be thriftily and intelligently utilized. Armies cannot fight unless well fed. Countries at war cannot give their armies adequate support if the home population is weakened by hunger and want. America is the one country among the allied nations which this year will produce foodstuffs in excess of her own needs. The measure of this excess will be the extent to which Food Thrift is practiced by every American citizen. If we permit waste to go on as in the past the surplus will be reduced to zero. If we engage in Food Conservation on a national scale it will become an abundance with which we may prevent starvation in Europe. Food Thrift, therefore, is the one true secret of success in the great war. With it we can win the conflict. Without it the most brilliant achievements of our armed forces will be of no avail and America must face her first defeat. The choice must be of our own making.

THE lumber industry is doing its share in providing material for national defense," said John W. Blodgett, Chairman of the Trade Extension Committee of the National Lumber Manufacturers Association today. "Reports to the National Association office by 691 mills just tabulated, show that during the month of June these mills cut 1,499,000,000 feet of lumber and shipped 1,581,000,000 feet, the largest volume of shipments ever reported to this office during any one month. Moreover, telegraphic reports from 300 representative Southern and Western mills show that during the last four weeks these mills have cut 655,000,000 feet of lumber and shipped 784,000,000 feet, of 20 per cent. more than they produced.

A GIANT SASSAFRAS TREE

FOLLOWING the publication in AMERICAN FORESTRY for January of the photograph of a veteran sassafras of unusual size at Horsham, Pennsylvania, Mr. Beirne Lay, of Keswick, Virginia, sends the following interesting account of a sassafras on the farm of Mr. Frank M. Randolph, near Keswick: "I enclose the photograph of the big sassafras. The measurements—20 feet 6 inches, at six inches above the ground, and 18 feet 4 inches, at five feet above the ground,—show this to be a good deal bigger than the Pennsylvania tree, and probably the largest in this country. Some years back this tree was a hollow trunk, broken off at the top and languishing. Someone built a fire in the interior which



SASSAFRAS TREE ON VIRGINIA FARM

The rival of the Horsham Sassafras, which only measured 13 feet in circumference 16 inches from the ground, while this rejuvenated—as the story proves—specimen measures 20 feet only 6 inches from the ground.

was quenched with difficulty. It was thought that the fire would finish the tree. Instead, it killed the bugs and hardened the interior surface and the old tree stump branched out, like a dressy old woman, in a new Easter bonnet, with the crown of strong, healthy boughs that you see in the photograph."

SAID the late Simon B. Elliott, one of the pioneer foresters of America: "I can come to no other conclusion than that of the 10,000,000 acres of non-agricultural land in Pennsylvania at least sixty per cent. is now, or soon will be so devoid of uninjured trees of valuable species that it must be planted to justify the payment of taxes."



A WONDERFUL SPOT IN GLACIER NATIONAL PARK

This shows the cliffs of Mount Gould, in that Alpine Paradise known as Glacier National Park, and typically illustrates one of the greatest charms of the region—the sharp contrast between the magnitude and grandeur of its mountain masses, and the quiet stillness of the waters of its beautiful lakes.

WILD FLOWERS THAT BOYS AND GIRLS SHOULD KNOW

BY R. W. SHUFELDT, C.M.Z.S.

MANY a girl and many a boy in this country delight in spending a good share of their time in the woods and fields at nearly all times of the year. If the country they get into possesses a certain degree of wildness, with lakes, and ponds, and marshes here

botanists; they can often correctly name a comparatively long list of the local species, and possess a fair smattering of the elements of the science. These require no pressing to be induced to take to the open with the view of gathering specimens new to them, and adding to their



THE RED CARDINAL FLOWERS

FIG. 1.—When these are in bloom in the midsummer time, or in the early autumn farther north, you will find them growing along streams, or in marshy places. Often you can notice them quite a long ways off.

and there, and with their natural outlets of streams, so much the better. Among these young ramblers there are generally a fair number who take a certain amount of interest in the wild flowers they come across, and who probably know the names of a good many of the dandelion, clover, or buttercup class; but, unless something arouses a deeper interest, they never get along any further than this. A few number have mastered the English names of a longer list of species, and are fond of taking flowers home to be kept a few days in receptacles containing water. Finally, the exceptional few, both girls and boys, are essentially young

store of knowledge in other ways; they are the very ones to help the others along, and are, under proper guidance, more than eager to do so.

Now it should be the pride of every American girl and every American boy to be able to name all of the flowers which are met with while out on trips through the country; such an accomplishment has no end of advantages, and in more ways than one thinks.

What we have before us this fine August day is to all get together, and start out for a long ramble over the fields, through the woods, along the edges of streams and marshes, and see just how many wild flowers we can find out something about—where they grow, what they look like, and what their



WHAT IS THIS BUSH?

FIG. 2.—It is not often that we meet with a girl or a boy that cannot give the name of the bush that bears the flowers shown in this picture. It is one of the most beautiful flowers in our country, and it has been named the Mountain Laurel.

names are. This is lots of fun, and you may be sure it is not the last time you will want to try it. On this first scout we will get after only the most abundant and easy ones to examine and name. As you know, in the right kind of country, wild flowers grow nearly everywhere, and there are hundreds of different species or kinds of them. This must not discourage you, however; for you will soon find out that, after you have studied one big, showy flower and named it, what you have learned about it will make it much easier to study the next one you bring home for the purpose.

The chief help you will have



THESE ARE EASY TO IDENTIFY

FIG. 3.—Surely you all remember the bright yellow flowers, like these, which you found in big patches in the marshy places and by the creeks, when you first visited the woods very, very early last spring. They are called Dogtooth Violets or Yellow Adder's Tongue.

when you first commence will be good pictures of flowers, to compare with those you gather in the woods. So you see we have given you a whole lot of pictures here "to go by," as they say; surely you will find out the names of some of the flowers in the woods and fields where you have been by comparing them with these.

Always remember that you have not the color in the picture to help you; but this does not apply to white flowers, or those that photograph white, as many do. All the flowers here shown were collected within a few miles of Washington; but then



A FUNNY-LOOKING PLANT

FIG. 4.—These have prickly, very thick, paddle-shaped joints, with sharp, needle-like points scattered over them. It is a true cactus, and the only one found in the Eastern States. The joints correspond to the stems of other plants, and the spines to the leaves. In the summer it has handsome yellow flowers on it.



TWO ONIONS? NO

FIG. 5.—Some boys might think that we have two onions here; but they will have to guess again. Really, it is a couple of Grape Hyacinths, and some people call it Baby's Breath, because it smells so sweet! Its flowers look like a little bunch of purple grapes.

that does not matter, for they are to be found over nearly all the eastern parts of the United States, and some of them far to the westward.

If you have been scouting lately, that is, during this month, down through the wet places in the meadows, where it is a little shady, or along some of the streams, you may have noticed flowers having the form of the one here shown in Figure 1.

They are usually of a very red color, and you can see them at quite a distance, for the straight stems that bear them may be nearly five feet high, and the flowers well above the tall grass where they grow. Sometimes you will find this bright red Cardinal flower, or Red Lobelia, as it is sometimes called, growing all by itself in some shady place in the middle of a swamp or marsh. You must not pick any more of these than you can help, as there are not many of them left; for, for many years, their lovely red color has attracted all beholders, and they have been gathered so mercilessly that now, in our time, they are hard to find, as nearly all are gone. Indeed, this should guide you with re-



THIS HAS A PECULIAR NAME

FIG. 6.—Sometimes, down in the moist places, but more often in the woods or in sandy soil, you will find this curious-looking plant, with its yellow flowers. It is the Four-leaved Loosestrife; but where the leaves start there may be as many as six leaves, as in the picture, just below the Dragon-fly.



THE CORN MUSTARD PLANT

FIG. 7.—Here is a plant that has very showy bright yellow flowers. They come out very early in the spring, but may last well into the fall. Sometimes hundreds of them grow in the meadow, and not very far apart, so you cannot mistake them.

spect to all flowers. Leave all you can in the woods, so other girls and boys can see them when they come out next year! This particularly applies to the beautiful flowers of the Laurel (Fig. 2); you have often seen careless



THE CARRION FLOWER

FIG. 8.—As you go along the edge of the woods, you cannot possibly mistake this plant if you come across one. It grows up much higher than your head, and has many flower bunches on it like the one seen here. The top is also shown. In the fall the big berries are purple, and it has a very bad smell. That is how it got its name.



NEARLY ALL KNOW THIS

FIG. 9.—There is hardly any use in telling you boys and girls what this beautiful flower is. It is of a lovely pink color, and some may be almost white. It is the Pink Azalea of the hill sides in the woods. See what dark leaves it has.

boys, some of whom did not even know the name of this very beautiful flower, break off whole branches of its stems with the blossoms on, to throw them away long before they got home to make any use of them. When you first went out to the marshes in the spring, you may have seen the flower that looks like a small yellow lily (Fig. 3). Sometimes it grows all over the damp or even muddy places to a height of six or seven inches, or even less. The pale green leaves are often beautifully mottled with brown; and when the seed-pods come, they are shaped like the one you see to the left in the picture. Maybe you will find one of these plants growing all by itself up on a bank by the stream; it is the Dogtooth Violet, and some people call it the Yellow Adder's Tongue. It has a number of other names. Anyway, you will know it by taking a good look at it here, remembering its curiously marked leaves, and its pretty yellow petals or leaves of the flower itself. It is not in any way a violet, and most of you will know better than that, surely.

In sandy fields, on dry rocks, and in the pine woods, you will meet with fine specimens of the Common Cactus in some places. The one here shown (Fig. 4) was growing on the rocks in the pine timber on top of the high cliffs on the Maryland side of the Potomac River, at Great Falls. There is plenty of it at Piney Point below. Nearly everybody knows what it is, and to this boys and girls are no exception.

Some plants you will have to hunt pretty hard for before you come across one. This is the case with the Grape Hyacinth (Fig. 5). The picture shows the whole plant, for the roots look like onions; and, by the way, whenever you can, it is a good plan to study the different kinds of roots of most plants. You will be surprised when you pull some of them up.

There is another wild flower that you certainly ought to know, for it is very pretty and very abundant, especially so this year. Loosetrife it is called, and some people call it Crosswort (Fig. 6). Some of you boys may know how this name of loosetrife came to be applied to this interesting little plant?

We next have a flower that blooms early in the spring, and



WHAT LILY IS THIS?

FIG. 10. Sometimes this beautiful lily grows down by the streams, but more often you will see it in big bunches along the country road sides; it is a deep, yellowish red. Nearly everybody calls it the Day Lily, because it blooms for one day only. See what a lot of buds it has of more flowers coming.

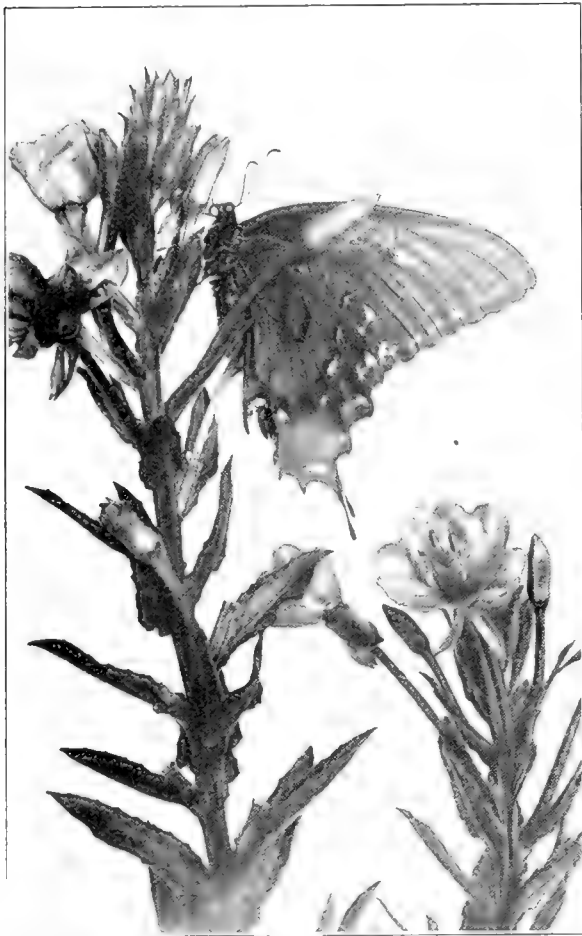
keeps on blooming all summer into the early autumn; this is the Field or Corn Mustard (Fig. 7), and its yellow flowers are so striking that, with the aid of the picture here given, you can hardly make a mistake about it. Near the city it may be seen growing on the waste heaps or in unoccupied lots. Birds are very fond of its pale, peppery seeds as winter comes on; this is especially true of tame pigeons, and they will eat quantities of them if they get the chance.

Sometime, when you get along a little further in your studies, you must read up about the Carrion Flower shown in Figure 8. It smells just like a piece of meat that has been kept too long in a warm place. This is for a very important purpose to the flower, and it is quite as important that in the fall its leaves should turn a brilliant red and green, for these colors attract many small birds on their way southward; as the seeds in the berries are then ripe, the birds come after them, and help scatter them, in one way or another, far and wide. The Carrion Flower is but another species of the Smilax or Catbrier, and every boy who goes into the woods knows what the Catbrier or Green-

brier is, with its smooth, glossy, and bright green leaves.

Our wild Pink Azalea (Fig. 9), which we all know so well, and love as one of the most beautiful of America's flowers, is the shrub from which the fine azaleas we see in the flower-stores came. About two hundred years ago, the Belgian florists received the wild one from the colonists here, and by cross-breeding produced the superb plant that you now see ornamenting our homes almost everywhere. Unhappy Belgium! She is not thinking much about azaleas now, with her lovely lands all devastated and ruined.

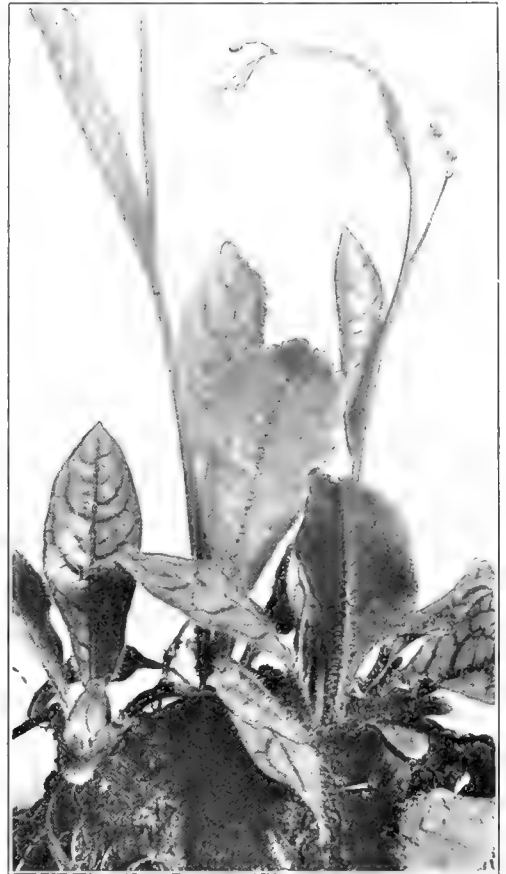
You must remember that many



COLORS LIKE LEMONS

FIG. 12. That is a Black Swallow-tail Butterfly which has just lit on the side of the bunch of buds of the Evening Primrose. Note the one in full flower down to the right. Those flowers are bright lemon yellow and very handsome.

flowers have, as the years have gone by, escaped from gardens, and are now found growing wild in all sorts of places. This is the case with a very large number of our eastern wild flowers, and it is true of the Day Lily shown in Figure 10. Through one way or another, a whole lot of our wild flowers have spread from Europe, and not a few from Asia and Africa. Naturally, as you will know from your geography, we find these first in eastern United States, but then, too, many of them have already spread far toward our Western States. Ages ago, when people were so superstitious—and only too many are so yet—it was



THIS HAS MANY NAMES

FIG. 11.—Some plants have very beautiful leaves, and this is one of them. Like most of its kind, it has a whole lot of names, as the Rattlesnake-weed, Early or Veinleaf Hawkweed, Snake Plantain, and so on.



HERE IS A QUESTION

FIG. 13.—Why they call these Common Burdock burrs "Beggar's Buttons" it is hard to tell; but that is one of their names—surely they would make very sticky old buttons.



EVIDENCE OF A TRAGEDY

FIG. 14.—That strange-looking little thing up on the leaf there is a poor little Saddle-back caterpillar, killed by a parasite—a story you will hear some day. There is no missing this Bittersweet Bush, for you can see its beautiful deep coral red berries at some distance away.

generally believed that all plants and flowers had some mark upon them to show what they were good for, and what they would do for sick or injured people. The rattlesnake-weed (Fig. 11) was one of these, and the "herbists" or old herb doctors, believed that since its curiously marked leaves looked like a snake's back, it was surely created to cure snake-bite—particularly rattlesnake bite. Did you ever hear of anything so stupid?

Evering Primrose (Fig. 12) you will find all the way from June to October in the dry fields and thickets—especially in the fence-corners and along the dusty roadsides, where so many other interesting flowers and plants are to be found.

The moth you see on these Burdock-burrs is the I-O, so called for the reason that either of its hinder wings, which are buffish-yellow like the fore pair, have a round, black O on them, with a purple bar to the inner side of it,

the whole bearing a fancied resemblance to the capital letters I O (Fig. 13). The leaves of the Burdock are among the largest you will find—scout where you may. No horse or cow will eat these because they are so very bitter and rank, and you know how common they are in many of our fields. Their burrs contain the seeds, and it is easy to see how people and cattle often carry them long distances by these very burrs, sticking fast to clothing or to the hair of the farm animals. There are all kinds of ways in which seeds of plants are spread over the world, so that the plants from which they come spring up in the most unexpected places.

The Bittersweet (Fig. 14) is not an easy plant to get a photograph of, for the



THESE NOT HARD TO FIND

FIG. 16.—These elegant flowers, of a brilliant purple color, are Starworts or New England Asters. The plant begins flowering in August, and you cannot very well miss it, for it not only grows in swamps and fields, but all along the roadside where you start out for your walk.



OLD MAN'S BEARD

FIG. 15.—In a little while after this month has passed you will see the Virginia Clematis gone to seed, and looking like it does here. Boys and girls call it "Old Man's Beard." At the same time the Horse Nettle is sporting its big, round, yellow balls, as you see them below.

beautiful, deep reddish orange berry-like fruit easily tumble out on the way home; then the empty capsules all look like the lowermost one in the picture. The leaves are very dark, but you will also find variegated ones, and others almost white. When this is the case take pains to study the stems closely; you will find most curious little "tree-hoppers" there in crowds, with their heads all pointing one way. They weaken the plant terribly, so that sometimes it has no seeds even.

Virginia Clematis or Virgin's bower (Fig. 15) is usually found growing in very rich earth near something upon which it may readily climb, as an old fence or wall, or over other vines, and on wayside thickets. It is a most interesting plant for you to study; and Darwin, the great British naturalist and philosopher, frequently used it in his experiments, when working out the wonderful climbing power of some vines. The Clematis hooks

on to everything in its reach as it grows, and sometimes almost seems to be guided by a certain kind of intelligence.

In Figure 16 we have a grand bunch of New England Asters; but why they are called so it is hard to tell, for they are to be found growing from Canada over the entire eastern United States, down as far as the Gulf of Mexico. There are a great many different kinds of asters; but you should have no trouble in naming this one, for its large, purple flowers are very striking, and then the stem is hairy and the leaves lance-shaped. After the first week in August, clear up to the middle of



she is very fond of butter. Most boys are fond of butter, too, as this flower will surely tell you.

When next spring, or early summer, comes round, you will meet with the bellworts thickly growing in the thickets and wet places, in the rich, shady woods. There are several species or kinds of them, but in all of them the beautiful light green flowers bend over or droop as you see them in the picture (Fig. 17). Some

A CURIOUS FLOWER, THIS

FIG. 18.—Around the thickets in the open woods, or sometimes up on the sides of dry, rocky hills, this strange-looking flower is met with. Its curious tops may run all the way from white to a deep magenta. You will not easily forget the only name it has, for from Maine to Mexico it is known as Wild Bergamot.



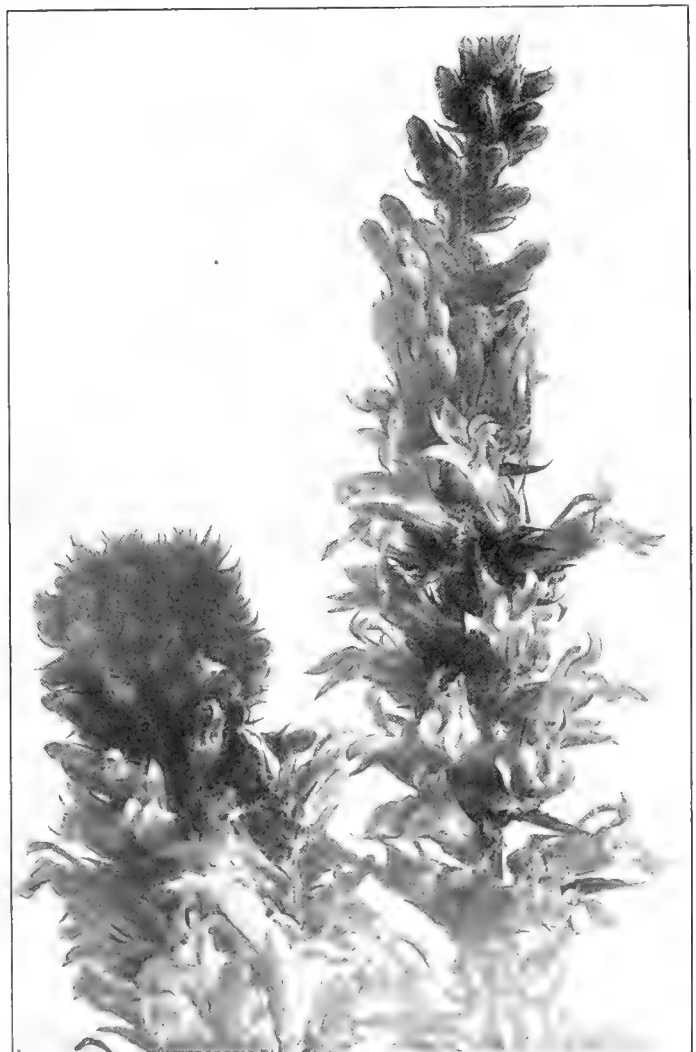
DIFFERENT KINDS OF BUTTERCUPS

FIG. 17.—When you come to study our Buttercups or Crowfoots, you will find that there are a whole lot of different kinds of them. The one here shown is the Early Buttercup or Crowfoot; note the hairy stems. The drooping flower is the Bellwort; it is pale green, and you can tell it by the long stem passing through the leaves.

October, you will find them, and of course, in the South, much later. Generally they grow where it is wet or moist, although sometimes we may find them doing beautifully right along the road somewhere. Later on you will find the Late Purple Aster; but the purple is of a lighter

shade, the flower-centers are smaller, and there are other differences which you may study up some day.

Many kinds of Buttercups (Fig. 17) grow in our country, and we meet with them at all times of the year. In some cases they are pretty hard to tell apart; but this hairy one, which is one of the earliest, should give you no trouble. If you want to find out whether that little girl standing over there loves butter, just pick a big buttercup and hold it under her chin—about an inch away—and if her chin turns bright yellow, you may be sure that



THIS GROWS IN WET PLACES

FIG. 19.—Here is one of the handsomest flowers we have, and you may find it in wettish places along streams and ditches, all the way from July to October. It is known as the Great Lobelia or Blue Cardinal flower, as its flowers really are of a bright blue color.

day it will interest you to know how all these plants get their hard scientific names, which frighten so many people away from a more serious study of them; this bellwort will give you some idea of it. All the different kinds of bellwort have *drooping* flowers like the one you see here, so we must have a group-name (genus) for them. It has been called *Uvularia*. Now if you will look down your throat in a glass you will note a soft little thing, hanging loosely from the roof at the back and directly in the middle of it; this is called the *uvula*; and, as a bellwort flower *droops* like a *uvula*, the group has been called *Uvularia*. That is not hard? Now we call this particular bellwort *Uvularia perfoliata*,—that is, it comes from the words meaning a leaf that is *pierced*; and, if you will take a good look at how the leaves (as they are shown in Figure 17) *appear* to be pierced by the stem (they really clasp the stem), you will understand why we so name this flower, and thus dis-

tinguish the *species* from all the other bellworts. You will come across Wild Bergamot in August, and there is a splendid specimen of it here given in Figure 18. The flowers run through a series of shades, all the way from white to a deep magenta. Scarlet Oswego Tea, with its deep red flowers, has a general look like this Bergamot, but you cannot very well confuse them.

Strange to say, the Great Lobelia or Blue Cardinal flower, is not so distantly related to the Red Cardinal flower seen in Figure 1; but why this is so is a long story, and too long a one to tell here. Sometimes its heads have a very different form as shown in Figure 19; but departures of this kind are seen in many flowers in nature, and you should always give them your attention. There is nothing present on the part of any flower which is not worthy of your most careful study. This big, blue Lobelia, with its wealth of bright blue flowers, sometimes grows to be fully a yard high; so you will have



MANY DISCOVERIES AWAIT HERE

FIG. 20.—A good place to look for water plants. The surface is covered with bright green scum, but this does not prevent your seeing the big plants above it, as the Cat-tails, the purplish Pickerel-weed and other things. Hear that big bull-frog croaking?

no trouble in finding plenty of it growing down by the marshes, and along the soft, swampy shores of sluggish streams. After you once know the plant, you will never forget it or its name. So, when you come to places where it grows, and meet with a dozen or more specimens standing up amidst the rank sedges and undergrowth, where you have been trying to force yourself through, it is a great satisfaction to say to yourself: "Oh, I know that thing; that's the Blue or Great Lobelia." Ten to one, you will meet with the red one or Cardinal flower as you go a bit further.

When the stream broadens and becomes still more sluggish, and reaches the pond in the woods (Fig. 20), you will surely have your hands full to gather all the lovely flowers you will find there. But then, Pickerel Weed, Skunk Cabbage, Jack-in-the-Pulpit, Water Arum, Cow Lily, Burr Reed, Arrow Head, and the rest of them, are all big and conspicuous flowers, and it is easy to find out the names of them. Be sure not to

forget to take your flower collecting-case, when you go out on a good, long tramp; you can buy a nice one at the store where they sell supplies for naturalists, and two dollars and a half is plenty to pay for it. You may find one for something less than that, say about one dollar and a half. Then you should take along some newspapers; some string; a few dozen common pins, and a small, strong trowel, or, what is better, a big table-knife to dig plants up with entire, when you want to study them at home. A good butterfly-net is another thing that comes in very handy; for the time will surely come when you will want to study insects as well as the flowers you find.

ONE of the very few towns where no taxes are assessed is Freudenstadt, Germany. This town of 7,000 has an annual governmental expense of \$25,000, and pays it all from the revenue of 6,000 acres of town forest.

HAS THE BLACK FOREST GONE?

BY JOHN B. WOODS

FIRST LIEUTENANT FOREST REGIMENT (10TH RESERVE ENGINEERS)

HAS Germany's famous Black Forest been destroyed? Have the wartime demands for timber been so great that, with her imports cut off, Germany has been compelled to cut down most of the Black Forest? Various reports received in the United States say a great amount of the timber has been cut, but these reports can not now be verified.

A million acres of woodland, divided about equally between the states of Baden and Wurttemberg, with relatively poor soil and fifty inches of rainfall yearly, the Black Forest is a splendid

example of natural woodland which could never be anything else half so successfully. The hills are bold and their summits windswept, while tiny settlements nestle down in sheltered ravines beside foaming creeks. Hardwood species are few in number, although the beech abounds to the extent of forming nearly a third of the timber wealth. But chiefly there are conifers, fir, pine, spruce and larch, of which the first named is by far most plentiful, the intertwining tops spreading a cover through which daylight scarcely can penetrate to the neatly carpeted earth. Even in modern times these black aisles have been peopled with all sorts of fearsome beings by superstitious people, tourists as well as peasants.

In the early days there were no sightseers wandering through the woods. In the first place there were no roads over which they might wander and then the region was infested with robbers, some operating upon their own accounts and others employed by the numerous petty barons who owned the land. Lumbering was an occupation beset with murder and thieving so that it is no wonder that the workmen were rough in every sense of the word. Before the time of using wood for building purposes to the extent that it possessed a commercial value the Black Forest was given

over to pasture and only fuel wood taken therefrom, but as time went on the petty lords took steps to increase the timber production. Throughout the Seventeenth Century they squabbled over plans of operation and agreed finally that cutting for market should be permitted.

So during the first half of the Eighteenth Century they worked upon the river Murg, improving it to the end that logs might be driven down to the broad expanse of the Rhine and thence to cities of the lowlands. And then for fifty years a timber firm was given free rein to



Photograph by C. W. Armstrong

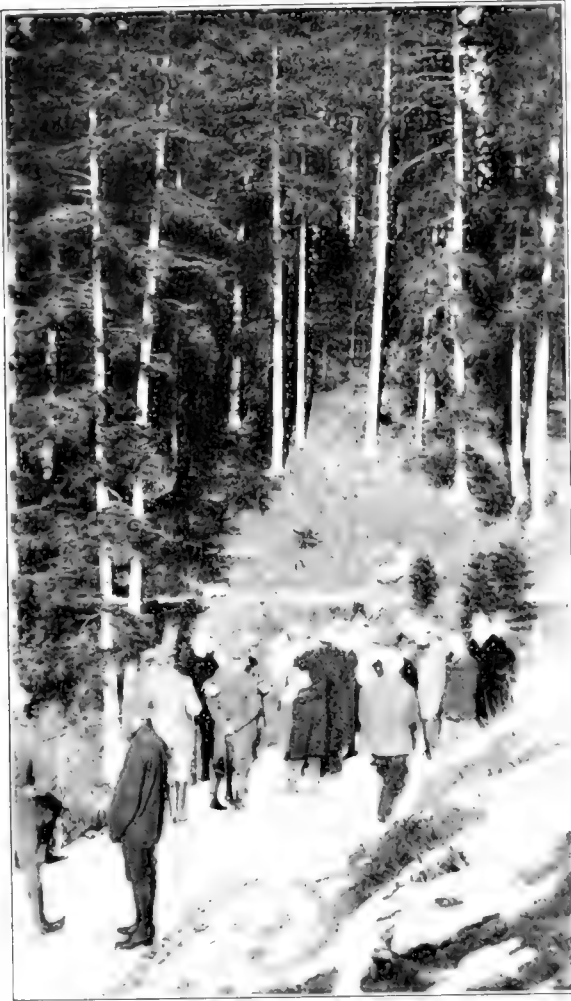
BLACK FOREST KURHAUS

One of the many sanatoria and hotels which are in close proximity to heavy timber and the roads to which wind through dense forests.

exploit the tree wealth, paying the owner the vast sum of six cents, or rather its equivalent, for each log taken away. Even then no roads had been constructed, for the streams furnished motive power for commerce, and land traveling was accomplished upon foot along narrow paths. As late as 1858 a stone splash dam was constructed at great expense to serve as reservoir for flood waters, and the builders stated plainly in their plans that it was to be for "Eternal Use."

All this activity meant the development of a fixed population within the limits of the forest, so logging villages grew up in sheltered and convenient locations where the loggers might find home comforts after the day's work. And in the winter months when woods work was at a standstill the menfolk toiled at home industries, weaving baskets, carving knick-knacks of one kind and another, and busying themselves generally, while the children hung about listening to the fearsome stories of creatures who leaped from their Daddies' imaginations to people the woods.

And then came the awakening of the German commercial giant. The states which had been evolved from scores of woodland principalities came to realize that they were vitally concerned in the progress of the Federation, so Baden and Wurttemberg set about



Photograph by C. W. Armstrong

BLACK FOREST SHADOWS

A typical bit of the famous Schwarzwald showing a group of German foresters and a number of visiting American foresters

realizing upon their natural and human resources. The Black Forest became a living business enterprise, representing several hundred million dollars of invested capital from which a life-giving revenue was required. Plans of cutting and regeneration were introduced and followed to the letter, and an era of constructive forestry was brought into co-ordination with the long practiced lumbering operations.

But great as the timber wealth was, another asset was soon to be developed in the warm medicinal springs which flowed from the northern margins of the hill areas. In fact the name of Baden suggests the kingdom's chief attraction from a commercial standpoint. Baden-Baden, Baden-Oos, Baden-This and That, all have become famous watering places

for the wealthy and afflicted of every nation. And in order that these visitors should not tire of the confinements of health resorts the wise authorities opened ways for them back into the hills by constructing highways of rock into every beautiful ravine and over each wind-swept summit. This made the timber readily accessible and did away with the need for drivable streams with their burden of upkeep, so that it became quite the thing for nimble pleasure automobiles to dash along the roads, honking in derision as they passed the more dignified log-laden motor trucks.

German foresters



Photograph by C. W. Armstrong

WATERFALLS IN BLACK FOREST

One of the numerous waterfalls which were such an attraction to the thousands of tourists who before the war were yearly visitors to the Schwarzwald.



Photograph by C. W. Armstrong

OLDEN TIME METHOD OF LOGGING

This photograph illustrates the method of logging during the first half of the eighteenth century in the Black Forest of Germany

handle their operations on the basis of yield and cost per acre, or rather per hectare, which is not the same except in principle, thereby distributing the outgo and income of a given area over the thousands of unit areas of which it consists. Thus we find that during a certain year they cut an average of fifty-four cubic feet per hectare, yielding in net revenue about five dollars. Considering the combined land and stumpage value this spells a profit of one per cent per annum, which is not staggering when compared with our own industrial stocks. But there is the great value which these forests lend to the country's tourist business, an asset beyond calculation in terms of money, for the hills are dotted with Kurhäuser where visitors before the war spent their wealth for the privilege of roaming among the fir trees. Moreover, out of the gross revenue the foresters spend a dollar per hectare upon the highways, which takes a heavy burden from the state. All in all it is a fine system, this co-operation of lumbering and health resort interests probably impossible where a weaker form of government would hesitate to dictate, but they are partly owned and wholly controlled by the powers of State.

And now we are told that the great catastrophe

has strained Germany's timber resources beyond the breaking point, in fact she could not supply her own needs in peace time, depending largely upon imports. And the Black Forest has perhaps gone down

before the ax and saw! Just what this really means we do not know, probably the chief attraction for future visitors has been removed, and the Germans are no better off than we in man-made woodlands and far worse so far as primeval growth is concerned, having little if any.

Of course they

will grow another Schwartzwald, but the task will require half a century or more. Maybe the flood of daylight will kill those mythical creatures of story, and the logging villages will rot down because their former occupants are dead in foreign fields or out of

work in their old home places. But for all this there are many lessons contained in the story of this area, some of them applicable to our own American conditions, and they are responsible for this brief and inadequate sketch. We also have watering places, and cities of summer tourists,

not to mention those year-around hives of industry and commerce. Woodlands are nature's finest gift for man's recreation and the noblest setting for his every day toil.



Photograph by C. W. Armstrong

THE BADENER SCHWARTZWALD

Note the orderly ranks of spruce and fir thriving under intensive forest management directed by Germany's best foresters.



Photograph by C. W. Armstrong

SECOND GROWTH IN THE BLACK FOREST

The development of a spruce plantation on rock soil. Here the steep hillsides are so well covered that erosion is reduced to the minimum by a thriving forest.

MAKING FRIENDS WITH THE BIRDS

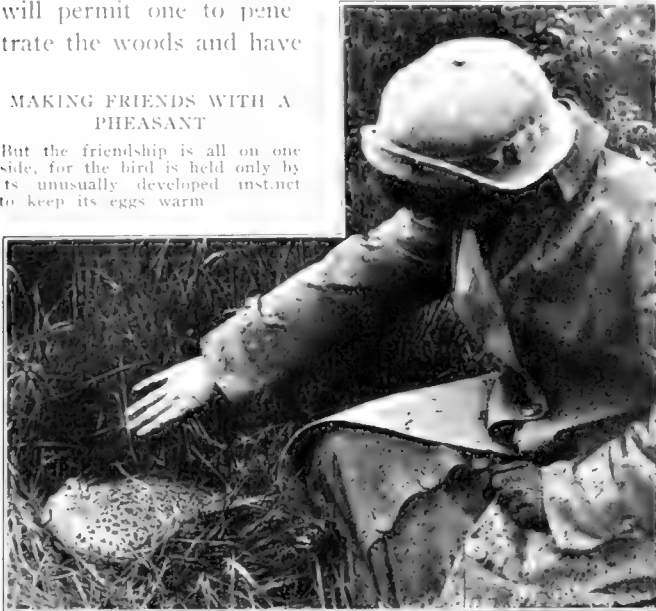
BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

THERE is a common belief, nurtured by the time-honored fables of Aesop and La Fontaine, that, somewhere, there lies hidden the key to the animal world; that there is a secret or mysterious language which, when discovered, will permit one to penetrate the woods and have

MAKING FRIENDS WITH A PHEASANT

But the friendship is all on one side, for the bird is held only by its unusually developed instinct to keep its eggs warm



the birds and beasts come from their retreats to greet one. The disappointment felt by the child when the birds flit from sight or when the squirrels scamper into their holes is shared by all of us, and whether we believe in the mysterious language or not, we all wish that there were some way by which we could individually



BEFORE FEAR DEVELOPS

Young Redwinged blackbirds responding at the approach of an intruder as eagerly as at the approach of their parents. The altricial young of most birds do not know fear until their wing feathers grow out and they are able to answer to the calls of their parents

make friends with the birds and the wild animals.

A small boy, when told by his teacher to study the habits of birds instead of stoning them, replied, "But birds don't have habits when I watch them." This thought occurs to most of us and so when we read some of the modern animal stories with their strong appeal we are led to believe, either that the authors have used their imaginations, or that they have some secret power or control over the animals they watch that permits them to penetrate so intimately into their lives. Some of the stories are avowedly fiction, but others are based on actual experiences with animals that have permitted the closest acquaintance.

This intimate knowledge, naturalists tell us, we may gain for ourselves, and, if we will but devote the time and patience to it, we can make friends with any bird or beast without having discovered a secret language. Pos-



ANOTHER FEARLESS (?) WARBLER

A chestnut-sided warbler, whose desire to feed its young has destroyed fear.

sibly this is so, if we do not expect too much. In my experience the number of wild birds or wild animals that have entirely lost their fear of man and become real friends has been very small. If one will remain absolutely quiet or if one will conceal himself or disguise himself so that he no longer appears like a human being, many animals may come close to him and appear fearless. But when the disguise is thrown off, fear immediately gains the upper hand. There are some birds which no amount of time or patience could bring to friendly terms, and there are others, even of the same species, which are more approachable than a self-conscious human being. Animal fear is the great stumbling block to one's becoming better acquainted with his wild neighbors. Birds are creatures

of instinct and fear is the predominant one. Without it "natural selection" would be of no avail and there would be no evolution.

Fear of man is as strong in birds as is fear of hawks or fear of predacious animals, developed not alone through the experience of the individual, but through that of the species and that of all birds. It is less strongly developed in those birds which have never seen man, but it is always present. Added to it, is the fear of everything that is unusual. Birds hatched in the far north and seeing man for the first time on their migrations southward, are less timid than their more experienced fellows, but their innate fear of anything unusual makes them somewhat wary and thus preserves them. Immature shore-birds, for example, and the young of many warblers, when they first arrive in the fall are surprisingly tame but, as soon as they have absorbed the timidity of their associates, there is no way of making friends with them. Once in a great while there comes a bird which is very slow in learning from its associates and



A FEARLESS CHICKADEE

But it is the lure of food and an insatiable appetite that have tamed him

whose fear instinct seems undeveloped so that it hops about apparently unconscious of the proximity of man. Unfortunately for our pleasure, these birds are usually deficient in other ways, as well, and do not survive long. If these birds could be preserved or if the immature shore-birds and warblers could be segregated from the rest of the bird world, we might develop a strain of birds actually fearless of man but, until that happens, we must be content with birds as they are, and take solace in the knowledge that their fear of man helps them to escape their other enemies as well.

The fear instinct appears in young birds with the development of the feathers and the power to escape or to



A COURAGEOUS LEAST BITTERN DEFENDING ITS NEST

No love is wasted upon intruding human beings, but its abnormally developed instinct to incubate gives it courage.

respond to the calls of their parents. The precocial young of such birds as grouse, ducks, grebes, rails, plovers and sandpipers, which are covered with down when hatched and able to run about, instinctively crouch and hide from



CLOSE OBSERVATION OF A BLUE-HEADED VIREO

The incubation instinct in birds is often more powerful than the fear instinct, and they lose their timidity of man.

the beginning, while the altricial young of other birds stretch their necks and open their mouths at the approach of an enemy as eagerly as at the approach of their parents. It is not until their wing feathers grow out or until they are able to respond to the calls of the old birds, that

though long continued kindness will help to dispel it.

The tenacity of the instinct varies with different species and with individuals of the same species. During the past winter, for example, we trapped for experimental purposes, a number of wild ducks of several species, canvasbacks, scaup ducks, black ducks, and mallards. Within a few days some of the canvasbacks became accustomed to our presence and dove and fed in the artificial pond with but little show of fear. The scaup ducks were slower to adapt themselves, and the mallards and black ducks remain sullen to this



BETTY FEEDING THE GESE

they crouch and hide or flutter from the nest upon one's intrusion. The fear is apparently instilled into them or acquired by absorption from their parents, for if they are taken from the nest before it appears and raised by hand, it never develops. Thus, the wary crow, when taken from the nest before it acquires the fear instinct, becomes so tame as to be almost obnoxious. On the other hand, if young birds are taken after it appears, they may never lose it, al-



WHEN HUNGER DOMINATES FEAR

Part of a flock of wild geese owned by J. D. Showell, at Ocean City, Maryland. They are valuable as decoys during the hunting season, and are very tame, coming to his call and even permitting discriminate petting.

day. Even among the canvasbacks, however, there is a difference and some are much tamer than others. An-



CAN YOU SEE THEM?

Young Killdeer, just hatched, crouching in the nest. In precocial birds such as the plovers, sandpipers, ducks, and grouse, fear develops immediately upon hatching and they hide upon the approach of an enemy.



THE SHELTERING HAND OF AN ORNITHOLOGIST

The little Blackburnian warbler does not appreciate the protection and submits to it only because of the precious eggs beneath her and her abnormally developed instinct to protect them.

other matter of interest, as showing how fear is transmitted, was that the few domestic ducks which were placed with the wild ones and which previously fed from our hands, immediately became wild, and even the pet Indian runners skulked in the corners like the freshly caught black ducks. Thus, in nature, individuals that might otherwise be tame, absorb fear from their more timid brothers.

It has been said previously that it is only abnormal birds in which fear is lacking and that their number is exceedingly small. In an experience with thousands of birds, I have found a few chickadees, one wood pewee, and one Blackburnian warbler which without the



NO FRIENDSHIP HERE

Apparently this black-throated blue warbler has no fear of man but in reality its timidity is merely overwhelmed by its instinct to feed its young. It was necessary to remain absolutely quiet or fear remained uppermost note the mosquitoes on the hand.

lure of food or anything else would allow one to touch them or would alight on one's person with absolutely no show of fear. One could walk up to the pewee, for example, as it sat on a low branch and touch its tail while it watched with a merely inquisitive look. I have found quite a number, however, in which the instinct to incubate or to defend the nest was greater than the instinct of fear. These birds would allow themselves to be handled on the nest but, away from it, they were quite timid. I have met with a number of others which, through the stress of cold or hunger, would allow themselves to be touched or



FEEDING "JIMMIE"

Young birds, even of the wary crow, if taken from the nest before fear develops, become so tame as to be almost obnoxious. If taken later, they often remain wild.

would take food from the hand, but in all cases fear still persisted although dominated by other instincts. Thus in the accompanying photographs, the Blackburnian warbler, the blue-headed vireo and the ring-necked pheasant are held by the powerful instinct to incubate, although all three have the fear of man. The least bittern is actively defending its nest. The fear of the chestnut-sided and black-throated blue warblers is overcome by the instinct to feed their young, while the chickadee is lured by food and the wild ducks by actual starvation. None of them, however, with the possible exception of the chickadee, could be said to be without fear. We have not, then, made friends with them, but merely have taken advantage of a temporary abnormal condition and, as soon as the instinct to incubate or to feed the young passes or the hunger is appeased, the birds once more assume a more normal attitude toward man.

PROTECT THE BIRDS AS A WAR MEASURE

THE food destroyed in America by insects and small rodents would feed the people of Belgium! Birds are the great natural enemies of these pests. The laws protect insect-eating birds, but many are being shot wantonly and for food. Every American has a direct, personal interest in seeing that these laws are properly enforced. Protection to birds means protection to the National Food Supply. Report to the nearest game warden all violations of the laws protecting the birds.

Bradford Torrey, in his charming essays, relates his delight at the discovery of an incubating vireo that would take food from his hand and permit itself to be stroked on the nest and tells of his disappointment when he learned that this was no special privilege permitted him, but that all people were treated alike. It was not a case of making friends with a bird, but

again of taking advantage of an abnormal condition. I have said that it is the unusual things which alarm birds. Birds may nest under bridges and become accustomed to the passage of teams six inches above their heads or on railroad trestles and not mind the roar of the trains above them, and yet the same birds may not allow a person to approach within ten feet. Birds have been known to nest on trolley cars and traveling cranes and to become accustomed to the transportation of their nests from place to place, when the same birds might have deserted their eggs for good if one approached the nest too suddenly or made a quick jump at the bird. Such things are possible only when they occur by degrees and so often that they become a part of the routine of a bird's life. Any bird will ordinarily allow one to approach within a certain distance of itself or its nest, varying with the individual, before taking alarm. If one moves slowly and uniformly, he can approach much closer, but if he makes sudden or jerky motions, pauses and starts, or attempts to sneak upon a bird, he usually alarms it at a much greater distance. Similarly the volume of a sound makes little difference to birds. The roar of a passing train does not usually alarm them when a little squeak will cause them to jump, because the sound of the train begins low and far away and gradually increases in violence, but at no time is the

added increase in sound sufficient to disturb the bird, though the whole volume of sound is hundreds of times more violent than that which would ordinarily alarm it. If the train should suddenly increase its speed or suddenly stop, the bird would become greatly alarmed, but as the sound dies gradually away it goes unnoticed.

If then we would make friends with birds or merely observe them without attempting to make friends, we must bear these things in mind. In the first place, fear is the predominant instinct and except in unusual instances or with abnormal birds dominates the bird's life. If one wishes to come on intimate terms with birds he must either seek out the unusual birds, take advantage of times of stress, or be content to conceal his identity, and like the branches of the trees become but a part of the bird's environment. If one will enter a woods quietly and then remain quiet and inconspicuous for an hour or more, the birds will resume their normal actions and he will see the woodland as it really is. If, on the other hand, he goes thrashing through the woods, he will cover more ground and scare up more birds, but they will "have no habits" except those of alarm. Select a spot near a bathing pool, a favorite feeding spot, or near the nest of some bird and there will be spread before him a panorama unknown to the rest of mankind.

A TREE OF LOST IDENTITY

BY JOHN FOOTE, M. D.

THE wood of this tree of lost identity was so valuable that cups made from it were presented as gifts to kings and pontiffs; its physical properties were so remarkable that famous scientific men studied it and embodied their observations in classical works that are still authoritative; its medical properties were believed to be so marvelous that they exceeded in the cure of diseases of the kidneys what cinchona had accomplished in banishing swamp fever—it was a veritable king among trees in the seventeenth century—yet its very name had disappeared from modern works on botany and pharmacognosy and its botanical origin was worse than unknown. Such is the tale of the *lignum nephriticum*—the botanical source of which was discovered very recently by a brilliant economic botanist who found that the tree producing the "kidney wood" was really a twin or rather that it had two botanical sources.

This wood was celebrated throughout Europe in the seventeenth century. It came from the Old World, the land of mystery, out of which had come tobacco, cinchona and other remarkable products. Marvellous as were the reports circulated concerning cures it had accomplished, even greater things were expected of it. For chronic kidney disease had claimed many victims long before 1827, when Dr. Richard Bright published his description of the disease which bears his name, and it seems to have been unusually prevalent in the period of the renaissance.

The *lignum nephriticum*, or "kidney wood," when pulverized and steeped in water produced remarkable color effects of an opalescent type, which changed in sunlight and shadow in the most amazing manner. There is nothing to indicate that its medicinal reputation was well founded. In fact, it has absolutely no value as a remedy in kidney disease. It has been well said that "the therapeutics of every generation seems ridiculous to the succeeding one," so we cannot afford to be scornful of the Spanish physician Monardes, who was first to call attention to the wood. In 1567 he wrote the following account of it:

"They also bring from New Spain a wood resembling that of a pear tree, dense and without knots, which they have been using for many years in these parts for diseases of the kidneys and of the liver. The first person I saw use it was a pilot, 25 years ago, who was afflicted with urinary and kidney trouble, and who after using it recovered his health and was very well. Since then I have seen much of it brought from New Spain and used for these and kindred maladies. * * * It is used in the following manner: They take the wood and make of it chips as thin as possible and not very large and put them into clear spring water, which must be very good and pure, and they leave them in the water all the time that it lasts for drinking. A half hour after the wood is put in, the water begins to assume a very pale blue color, and the longer it stays the bluer it turns, though

the wood is of a white color. Of this water they drink repeatedly and with it they dilute their wine, and it causes very wonderful and manifest effects without any alteration nor any other requisite than good order and regimen. The water has no more taste than if nothing had been put into it, for the wood does not change it at all. Its complexion is hot and dry in the first degree."

Francisco Hernandez, protomedico of Philip II, who returned to Spain in 1577 after having spent seven years in Mexico studying the resources and useful products of that country, added nothing to Monardes' description of the wood, but gave testimony as to its medicinal virtues, and for the first time described the plant producing the *Lignum nephriticum* of Mexico.

Interest in the question of the botanical source of this wood was revived by W. E. Safford, economic botanist, U. S. Department of Agriculture, and an article appeared in the Smithsonian Report for 1915 under the title "*Lignum Nephriticum*—Its History and an Account of the Remarkable Fluorescence of Its Infusion." Mr. Safford traced the printed records of the wood through many years and various languages, the whole constituting a remarkable piece of botanical detective work. Here are some of his conclusions:

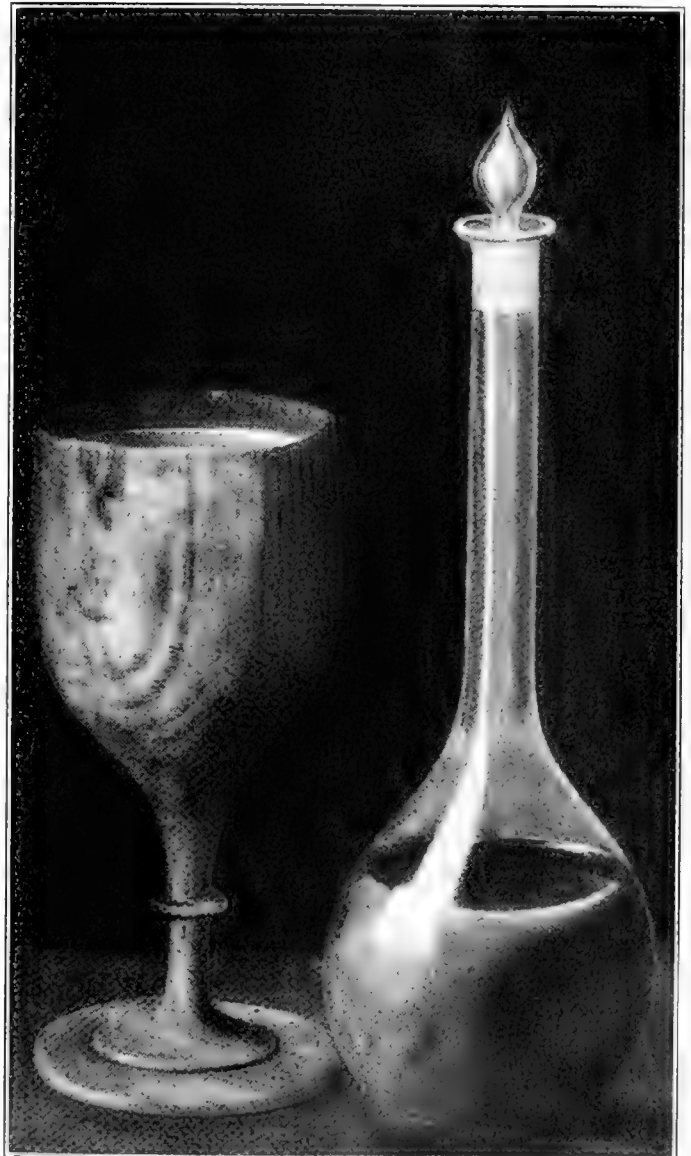
"In 1646 Athanasius Kircher, a German Jesuit living in Rome, celebrated for his great learning and his contributions to science, published an account of *Lignum nephriticum* in his *Ars Magna Lucis et Umbrae*, under the heading 'On a certain wonderful wood, coloring water all kinds of colors.' (Op. cit., p. 77.) He calls attention to the fact that other writers before him had described the wood as coloring water only a blue color; yet in his experiments he had found that it transformed water into all kinds of colors. His description of the plant yielding the wood was not made from observation, but was undoubtedly taken from Ximenez's translation of Hernandez's work, published 31 years previously. He then goes on to say:

"The wood of the tree thus described, when made into a cup, tinges water when poured into it at first a deep blue, the color of a Bugloss flower; and the longer the water stands in it the deeper the color it assumes. If then the water is poured into a glass globe and held against the light, no vestige of the blue color will be seen, but it will appear to observers like pure clean spring water, limpid and clear. But if you move this glass phial toward a more shady place the liquid will assume a most delightful greenness, and if to a still more shady place, a reddish color; and thus it will change color in a marvelous way according to the nature of its background. In the dark, however, or in an opaque vase, it will once more assume its blue color."

"Kircher announces that he was the first to observe this chameleon-like color, as far as he knew, in a cup given to him as a present by the procurator of the Society of Jesus in Mexico. This cup he afterwards sent as a gift to his Sacred Majesty the Emperor, as something rare and little known. 'But,' he adds, 'as to the cause of the strange phenomenon which I observed, I

failed at first to understand it; for I saw that the color could be counted neither among the apparent nor the true colors; not among the former, because the true or real color comes from the nature of the wood and not from the light variously modified, as is usual with apparent colors; nor can it be considered a real color, since no color is seen in it when it is held up against the light; and it assumes different kinds of colors only when held against different objects.' The learned philosopher, true to his boast that there was no problem in nature that he could not solve, concludes with the statement: 'Taught, however, by various experiments, I have at last found the cause, which I shall publish hereafter.' This, however, he never did.

"Four years after the publication of Kircher's work Johan Bauhin, in his *Historia Plantarum* (1650), describes a second cup made of *Lignum nephriticum*, which he had received under the name of *Palum indianum* from a colleague, Dr. Schopffius, physician to the Duke of



CUP MADE FROM THE WOOD OF LOST IDENTITY

This cup is of *Lignum nephriticum* and with it is a flask containing water in which chips of the wood have been soaked. The water is thereby colored and the wood gives it a property which was supposed long years ago to make it medicinally valuable.

Württemberg. This ingeniously made cup, almost a span in diameter and of no common beauty, resulting from the variegated lines adorning it, was accompanied by sawdust or shavings. When water was poured in the cup 'a wonderful blue and yellow color' was produced 'resembling the opal' and 'wonderful to behold.'

"The color phenomena displayed by the extract of *Lignum nephriticum* were first investigated in a truly scientific manner by the Hon. Robert Boyle in 1663. The results of his studies were embodied in his *Experiments and Considerations Touching Colors*, page 203, 1664, a Latin translation of which (1667), and also a summary of the results of Boyle's studies in Richard Boulton's edition of Boyle's works (1700), are in the library of the Surgeon General of the Army at Washington."

Mr. Safford traces the cause of confusion regarding the identity of this wood which arose among botanical

writers from the beginning, and cites numerous authorities who had incorrectly placed its source. His solution, and a succinct summary of the facts he has ascertained are given:

"*Lignum nephriticum*, celebrated throughout Europe in the sixteenth and seventeenth centuries for its diuretic properties, but chiefly remarkable for the fluorescent properties of its infusion, comes from two distinct sources: (1) From a Mexican shrub or small tree, *Eysenhardtia polystachya*, the wood of which was used by the Hon. Robert Boyle (1663) in his well-known experiments on the fluorescence of light; (2) from a large tree of the Philippine Islands, *Pterocarpus indica* (*Pterocarpus pallida* Blanco), the wood of which, described by Kircher (1646) and Johan Bauhin (1650), was at one time commonly made into cups by the natives of southern Luzon. It is possible that cups were also made from allied species of *Pterocarpus* growing in Mexico, but there is no record of cups of known Mexican origin. That which Kircher received from the procurator of the Jesuits in Mexico had in all probability been brought as a curiosity to Mexico from the Philippines, for at that time the only trade route from the Philippines to Spain was by way of Mexico. It is also quite probable that Monardes's wood and the wood mentioned by Hernandez as being carried on shipboard in the form of large logs was Philippine *lignum nephriticum*.

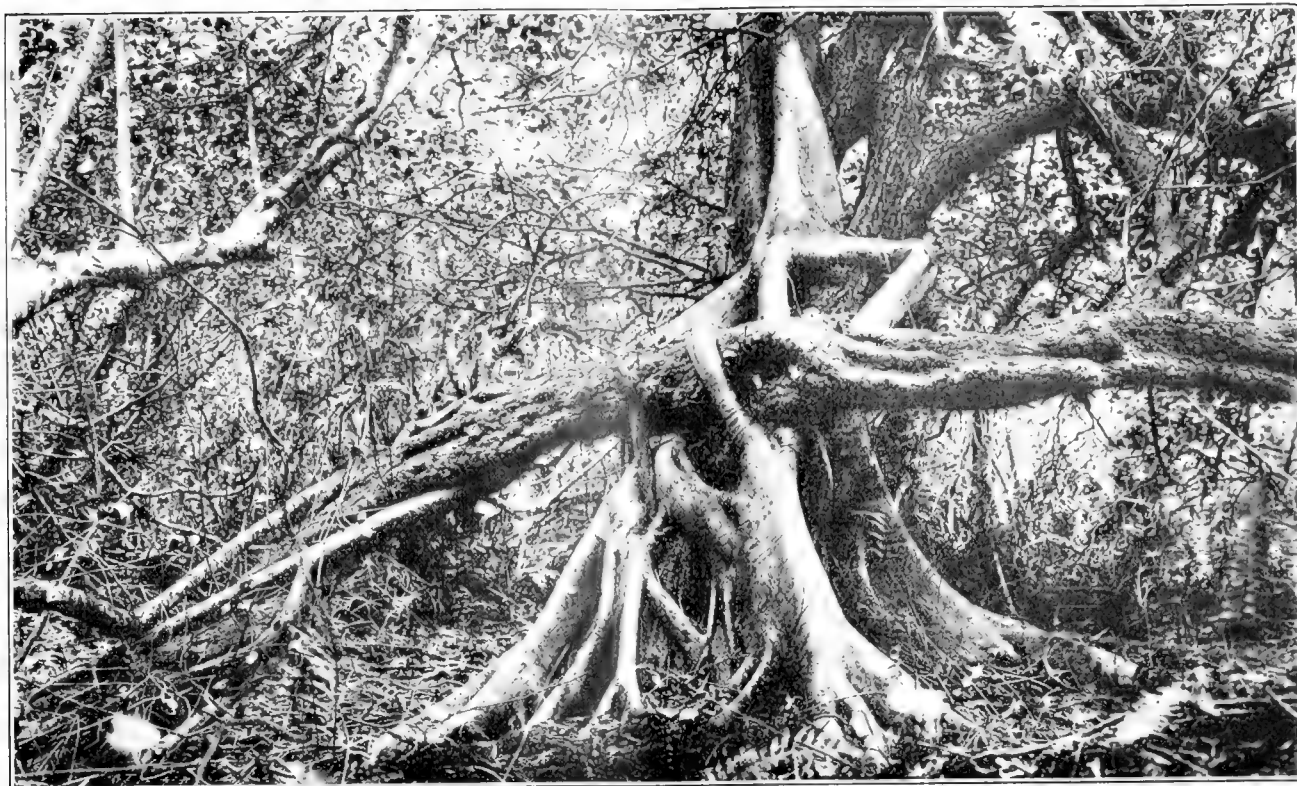
"The source of *lignum nephriticum* has remained uncertain for so long a time owing to the following causes: (1) Neither the Mexican nor the Philippine wood is known in its native country by the name *lignum nephriticum*; (2) from the beginning of its history the two woods bearing this name among pharmacologists were confused; (3) pharmaceutical material and cups were unaccompanied by botanical material; (4) botanical material in herbaria was lacking in wood and was usually unaccompanied by economic notes; (5) the original botanical descriptions of the species yielding *lignum nephriticum* were unaccompanied by references to the phenomenon of fluorescence; (6) the source of the wood described by Monardes was sought in Mexico, but was in all probability of Philippine origin; (7) attempts were made to identify the Mexican plant described by Hernandez with the wood described by Monardes and the cups described by Kircher and Bauhin, which only led to confusion."



LIGNUM NEPHRITICUM LEAVES AND TRUNK

The specimen from which this photograph was made was grown on the island of Luzon in the Philippines.

THE hickory bark beetle kills many thousands of trees every summer. Trees killed by it may be recognized by the very striking burrows made by the insects under the bark. These consist of a single gallery extending with the grain of the bark from which on each side extend numerous straight or slightly curved galleries two-thirds inches long. This is a very serious pest and a tree once attacked can seldom, if ever, be saved.



Courtesy of the New York Botanical Garden.

A STRUGGLE FOR SUPREMACY -WITH THE HONORS TO THE FIG

In a hammock on Roberts Island in the Everglades west of Little River, Florida. A strangling-fig, pale-barked tree, grappling a cocoa-plum, horizontal tree-trunk in front, and a swamp-bay, erect trunk behind. Note strongly buttressed trunk of strangling-fig.

A DUEL TO THE DEATH

OF a very wonderful trip into Southern Florida, on a botanical exploration in 1916, Dr. John K. Small writes most interestingly in the *Journal of the New York Botanical Garden*. What he says regarding the immediate region surrounding Roberts' Island, where the unusual and striking photograph shown above was taken, is quoted:

"We went by automobile through the pinewoods to the edge of the Everglades. There afoot we took to the water and mud, and waded for a distance of three miles in a westerly direction in water mostly knee-deep and mud at the same time half as deep or of equal depth, until we reached the hammock. The trip requires strenuous wading, which must of necessity be made at a pace compared with which a funeral march would seem quite rapid; but the objective is worth the effort. This island is several miles long, standing north and south in the Everglades, and about a quarter of a mile wide. It is densely forested throughout. Much of its surface is so low that it is submerged during the rainy season. The soil of the low parts is mud and humus. This supports an almost impenetrable jungle made up mainly of pond-apple trees, cocoa-plum trees, and red-bay trees, and ferns. There are ferns by the square rod and ferns by the acre. The Boston fern and the sword-fern constitute the largest and most beautiful beds. Several kinds of epiphytic ferns and a few species of air-plants often cover the limbs of the trees. The higher ground of the island is sandy. There the live-oak is the dominating tree of the forest, and each tree constitutes a

hanging garden. Orchids, air-plants, and ferns completely clothe the limbs of the larger trees. However, plants do not have a monopoly of the trees. There are also epiphytic lizards and epiphytic snakes! There is everywhere present a beautiful green snake. It inhabits the hammocks and it is especially abundant in those of the Everglades. It lies outstretched on the branches of shrubs and trees and glides along the branches from one tree to another with surprising ease. One has usually to be careful to look before laying hold of the limb of a tree for support, or he may grasp something of quite different consistency from that of wood!

"The shrubs and herbs here represent more northern kinds than are met with in the hummocks of the nearby Everglade Keys. Among the more interesting discoveries on this island was a gigantic plant of the compositae, *Zamia pumila*, which had not previously been found south of Fort Lauderdale. The specimen mentioned had a very large branched underground stem, and an unusually fine cluster of leaves, each one over four feet tall. So striking was the plant that we dug it up, photographed it, and replanted it.

"After a profitable day on this island, we retraced our steps through the Everglades and found our automobile without special incident, except that one member of the party got his legs tangled in the coils of a large water moccasin, and in the excitement and confusion of trying to get away in a hurry he fell prone in the mixture of mud and water. Both snake and man were equally surprised at the sudden meeting and neither had time to harm the other."

CHASMS OF EROSION AND FOREST DEFENSE

BY CHARLES A. WHITTLE

NO more striking exhibition of the results of erosion within the historic age is to be found than in parts of Georgia near the river basins along the dividing line of the Piedmont and coastal plain regions. Chasms two hundred feet deep, with tall trees growing from their bottoms, but with sides bare and gullied, have been resolutely gnawed deep into the plateaus by the forces of erosion. Farms have been riven, barns and houses have been engulfed and generations of men have looked with awe and helplessness upon the phenomena.

During geological ages of the long past, the now gashed and barren earth came down with the floods and found its present resting place. But now the police forces of nature are commanding it to "move on" and sturdy liquid minions are set to hustling it.

Only one staying hand has been lifted—the dark pine forests that grip the earth with strong fingers and resolutely confront the dragons of the caverns. Where the forest is weak the chasms have pulled it down. Where the forest is strong the caverns give up the struggle.

Man has taken cognizance of the combat and given his only aid to the struggle against erosion; he has learned to let the forest alone where the gorges encroach. To plant a forest athwart the line of approach has seemed futile to the farmer land owner. He realizes now long it takes to grow a forest and how formidable it has to be to withstand the under-cutting of the persistent force. So that once the gorge has invaded, the farmer abandons hope of ever again bringing the land under agricultural subjection, so forbidding are the rough steep slopes and



INVADING GOOD FARM LAND

Each day erosion nibbles more and more of the farm land and wood lot seen in the upper section of the picture and a great wedge is being driven into a valuable property.



NOT THE GRAND CANYON

This shows erosion of land in Stewart County, Georgia. Note the depth of the gully in which large trees are growing and how wooded land (left upper corner of picture) is threatened by the progress of the erosion.

so narrow and tortuous the bottoms of the gorges.

The sculpturing elements have left grotesque and often picturesque monuments along the courses of these chasms, as if to redeem their merciless work from utter sordidness. Behold the towers, the minarets, the miniature representations of the Alps, the Grand Canyon, the "Bad Lands"; see the carved animals and strange forms of no name—the grand and grotesque in these valleys of destruction!

If we pry into the secrets of this strange gallery there is an apparent reason for all of the sculpturing. Capping each upstanding figure is a protecting stone, often scarcely larger than a hand. From this stone slopes the earth forming a very pretentious peak. One



FANTASTIC SHAPES DUE TO EROSION

A scene in Stewart County, Georgia, where in a deep gully are strange shapes left as the water and weather eat away the soil.

stroke of a walking cane can dislodge this sentinel and last defender and leave the mass beneath a prey to the croding elements.

The tree growth at the bottom of some of these gorges affords interesting data. Without doubt the trees have sprung from seed. The transfer of a tree or even a young sprout to this site is against all probabilities. A determination of the age of the trees would in a measure, afford data for determining the probable length of time the gorge has existed at its present depth, or the depth at which the tree found its footing.

Many trees of commercial size are found in these gorges, but so inaccessible are they as to be considered of little commercial value. The problem is one of lifting the cut timber out of the gorge to the level. To make a road out would be too expensive.

Some of the most striking exhibitions of this phase of erosion can be seen in Stewart county, Georgia, from which the accompanying illustrations were taken. In this region are the terrace lands characteristic of the deposits of soil brought down from the Piedmont to the coastal plain region. Along the river basins especially, the terraces almost attain the dignity of plateaus. In these redeposits of earth, and in a region of heavy rainfall, of course, erosion is to be felt with greatest severity and unusual problems for the conservationist are afforded.

THE caterpillar of the Tussock moth is of a general gray color with its back ornamented with a series of four tufts of white hair. The head is bright red in color and has two pencils of black hair extending forward while a single similar pencil extends back from the end of the body. The very best way of fighting this voracious leaf eater is by collecting and destroying the egg masses during the winter or spring.

DESTROYING TREE PESTS

COMPETING for prizes offered by the Clinton County Agricultural Society, school children of Clinton County, New York, have prevented the ravages of more than two hundred and seventy million apple tree worms during the past three years, by destroying the egg masses before they hatched. In 1914, when the contest started, 175,965,250 worms were accounted for, the hatching of 95,000,000 was prevented in 1915; and 10,000,000 perished in the vigorous campaign of 1916.

The Society has made public comprehensive plans for continuing the work, with the object of completely exterminating the pest in the county. This year the different schools in a town will compete against each other, rather than one town trying to wrest the prize from another, and the increased number of prizes will mean added interest on the part of the children.

The figures above give a definite idea of the rapidity with which the number of worms is decreasing, as a result of the campaign, and leads to the belief that Clinton County will soon be entirely freed from the destructive activity of these pests.

TREE BOWS ITS HEAD AT NIGHT

From Simla, India, comes this story:

"The educated public in Bengal is excited over the discovery of a palm tree which is exhibiting certain remarkable phenomena.

"This tree is on a plot of land owned by an inhabitant of Faridpur. In the morning it stands erect, with its leaves outspread; but after sunset it bows its head, the leaves touching the ground, as if prostrating. This is witnessed every day.

"Ignorant people have come to regard it as an abode of some god. Hundreds of men, women and children visit it daily and offer pujahs near it. It is even stated that many persons have been cured by offering pujah.

"Sir Jagadish Nunder Bose, the renowned botanist, sent some of his assistants, with a self-recording apparatus specially constructed for the purpose to discover the cause of the phenomenon. It has been found by dynamometric measurements that 'the internal forces, whose periodic fluctuation causes this remarkable movement, are very great, the pull necessary to bring the tree down to its position of prostration exceeding several hundred weights.'

"Notwithstanding the thoroughly scientific explanation that this phenomenon is entirely natural, the owner of the tree is still making a good income from the pujah offerings of pilgrims."

THE heavier the fire wood, the more heat to the cord. Hickory, oak, beech, hard maple, locust, ash, and elm have high heat value, and one cord of seasoned wood has a value as fuel equal to one ton of coal.

Forestry for Boys and Girls

by Bristow Adams

WOOD FOR FUEL



NOW THAT the kiddies are enjoying the coolness of the swimming pool under the waterfall, it may not seem to be a good time to talk about wood for burning. Yet Mr. Hoover and Mr. Pack are doing their best to make us look into the needs of the days to come; and some good persons we know are sitting in the draft of an electric fan this very minute making Christmas presents.

I am reminded that Everett took a dollar away from his father on the strength of having the courage and skill to swim all the way across the pool; and Toto is thinking up some way that he, also, can drag a dollar from the old man's jeans. All the rest have earned a whole dollar at once within the past six months, and they think that they are "putting it all over" their father. Eleanor got him to offer a dollar as a prize for making a good loaf of bread. She earned it fairly, but it must be confessed that she hasn't made another loaf since; and a dollar a loaf is a rather high price, even in war times. Gertrude arranged for a dollar reward when she was able to recite Lincoln's Gettysburg Address without an error. She made a great many attempts, but each time she left out a word or got some of them twisted, until at last she said:

"Father, I have just got to learn that speech and earn that dollar, because I have borrowed against it from Mother and the rest until there's only ten cents coming to me."

That night she was letter-perfect on the Address, and paid up all her debts. She could not help feeling that she had done a lot of work and had got only ten cents from it, after all. She wanted to eat her cake and have it too.

THAT is what is the matter with the American people. We have eaten

our cake, in the form of forests, and gas wells, and oil wells, and the richness of our soils, until now we are beginning to find out that we can not use them and waste them, and still have them. Bismarck, the great man of the great nation which we are fighting, said in 1868, or a half-century ago, that the real test of the American form of government would come when we began to feel the pinch; that any nation could go forward and do big things as long as it was rich and there was plenty for all, but that it would fail when a good living no longer "came easy." Some folks say that we are beginning to feel the pinch already, and many there are who hope that the awful war will bring in its train at least the good idea that all must think and act to make it a kind and safe place where men may live, instead of a bitter place where men must die. It is already teaching us wise thoughts and good deeds that we had not thought worth the thinking or doing.

ONE of these thoughts and deeds is to save the waste. Looking forward to next winter, one of the wastes we can save is the waste of fuel, and particularly the waste of coal. And a way to save coal is to burn wood. Wood grows again and again; coal once gone is gone forever. More than that, wood is a good fuel, is a cheap fuel, and can be found almost anywhere.

ONLY a few days ago the whole family went fishing. Before we caught any fish we made a fire-place of stones and laid over that an old grill which we keep for just such uses. But no one was asked to gather any wood.

"I know," said one, "Father doesn't want to put any hoodoo on the fishing by getting so much ready beforehand that the fish won't bite. It's like carrying an umbrella to keep away the rain, or not cleaning up the house when you want company to come."

However, each one caught some fish, clear down to little Toto. After the



fish were cleaned and ready to be broiled, the children found a wonderful fire already made, with no smoke or flame, but with even, strong heat. It was made from charcoal, which had been bought from Caesar, our Italian neighbor down in the valley. He had learned to use it in Italy, and always made and kept a good supply on hand. Some of it he sold at a fair price, for it is a clean, cheap fuel. All we had needed for our fish had cost only a few cents—though Caesar had wanted to give it to us,—“you soocha gooda peop’,” he said. (The truth is, that Caesar and his folks are the such good people!) We had carried it to the fishing place in a light paper bag, and it served our purpose exactly.

MOST of us have forgotten the use of charcoal, and have begun to overlook the use of wood for making heat. Time was when all our best meat was smoked over smouldering hickory, which cured it through and through and gave it a delightful flavor. Nowadays, we look for short-cuts and paint our meat with creosote under the fancy name of Liquid Smoke, or some other fine-sounding phrase, invented by a city advertising man who never may have known what real smoked meat is.

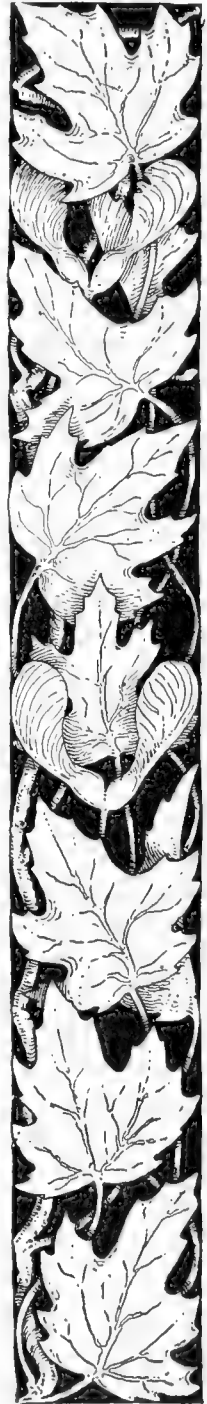
In some places they still use quantities of chestnut wood in brass foundries because it makes just the right heat for melting the metal to make the castings. Many small bakeries still use wood, and claim that no other fuel is as good for baking bread; vessels put in Key West regularly to get the button-wood which grows on the Florida Keys and burns in the cooks' galleys with no smoke and little ash. One whole section of the Louisville and Nashville Railroad, in west Florida, is run by wood-burning locomotives, or was so run only a year or so ago. These locomotives used the resinous lightwood of longleaf pine, mainly from

the old roots, and the train stopped often at track-side wood-racks to refill the tender, stacking it high with the twisted and knotted stump wood. From the point of view of the traveler one can not wholly favor it. In the hot summer the car windows could not be kept closed, and the flakes of tarry soot came floating in to stick to everything they touched, like thick, greasy, black cobwebs. But every cord of wood saved a ton of coal.

THAT is what we must all think of now. There are thousands of cords of good wood going to waste. The skeletons of blight-killed chestnut trees point accusing fingers to heaven, in all our north Atlantic states. They show so plainly that they seem almost to say, “Come take us away from here where we are so naked and ashamed. Let us burn for you, instead of standing here as records of man's carelessness.” It is so easy to persuade ourselves that the work will not pay for itself! When we try, we are likely to find that it does pay, and we are likely to learn more and more that it always pays to practice thrift.

NOW is the time to spot the dead-topped, and crooked, and diseased trees, and the time to mark the wild cherries that are not likely to furnish good timber, but are harbors for the tent caterpillars that do so much harm to orchard and woodlot. The removal of all these types of trees will make the woodlot better, and cordwood cut this summer will be well-seasoned for next winter's use, if it is split and piled. The work may be done on most farms, with the extra summer help, during the period between haying time and the early grains at the beginning of the season, and the final fall harvests. The poor trees make good enough wood for burning, and when they are gone the other trees have a chance to grow straight.

(Continued on next page)



EVEN if one cannot use the wood all on the farm, it is not hard to find a market. In nearby towns there are many persons who have open fire-places in their homes, and who would like to keep them burning on winter evenings, as household altars, but they have a real difficulty in getting the wood, even though it is only a few miles distant, at most, and going to waste from being allowed to decay. The money from the cordwood is not the only return; the trees that are left will take on increased girth because they are given more room and light.

THEN, too, coming back to the war,—as we all do no matter what we start to talk about these days—the government is likely at any time to need all the coal it can get its hands on, for big manufacturing or for the navy. The use of wood will release coal for these purposes, and the trees will, in this respect, perform still another service in helping us to win.

To use our forests for firewood, provided they are used in the right way, is to save, and not to waste them. By being careful and thrifty we can "eat our cake and have it too," with the trees, because, with wise use, they will return more and more. They are not used up as the coal will be, if we do not save it. Only when the trees again furnish a great deal of fuel, as they did in the days when men thought of coal only as a "black stone," will we be practicing the thrift which must prove the words of Bismarck to be false.

NATIONAL FORESTS RECEIPTS INCREASE

RECEIPTS from the National Forests in the fiscal year just closed exceeded those for 1916, the banner previous year, by more than \$600,000 and totaled over \$3,450,000. The cost of operating the Forests, about \$4,000,000, was virtually the same as in 1916.

The increase, according to the forestry officials, came chiefly from a more active timber business and from the higher fees charged for grazing, although practically every form of use of the Forests was greater than ever before and nearly every revenue-producing activity contributed to the gain. The only exception was that of sales of turpentine privileges, which fell off nearly one-half. Since these sales are made only on the Florida Forest the receipts from this source are relatively small.

The timber business realized for the Government over \$1,600,000 and live stock grazing over \$1,500,000. Permits for water-power development brought in over \$100,000 and other forms of land occupancy, including leases of land for summer homes, as much more. In this item the gain was 28 per cent.

It is pointed out by the Forest Service that many forms of use of the Forests bring in no revenue. Settlers in and near the Forests are allowed much free timber for domestic and farm use and are also allowed free grazing up to ten head of milch or work animals. As public recreation grounds the Forests are open to all without charge, while their almost inestimable value for

water conservation is maintained solely at the cost of the Government. Although their administration and protection as public utilities necessitate large expenditures which yield no money returns, the narrowing gap between expenditures and receipts holds out the prospect, those in charge of the work feel, that the revenues will in no great time exceed the operating cost.

With the demand for timber markedly stimulated by war conditions, the Government foresters anticipate a further increase in the National Forest cut and the receipts for timber during the current year. On the other hand, they point out that an increase in business will necessarily call for more work and increased costs. Congress provided for this by increasing the funds available this year for National Forest administration and protection by about \$80,000.

Of the grazing receipts cattle furnished approximately \$900,000 and sheep \$570,000. On account of the feed shortage faced by the live stock industry throughout a great part of the West last spring, and because of the needs of the nation for meat, wool and hide production, the stock were admitted early and up to the full limit of the carrying capacity of the ranges. As a result of regulated grazing the capacity of the ranges has been growing greater for some years, the Forest Service officials state, and the increase in grazing receipts is in part due to the fact that the herds on the Forests this summer are larger than in any previous season.

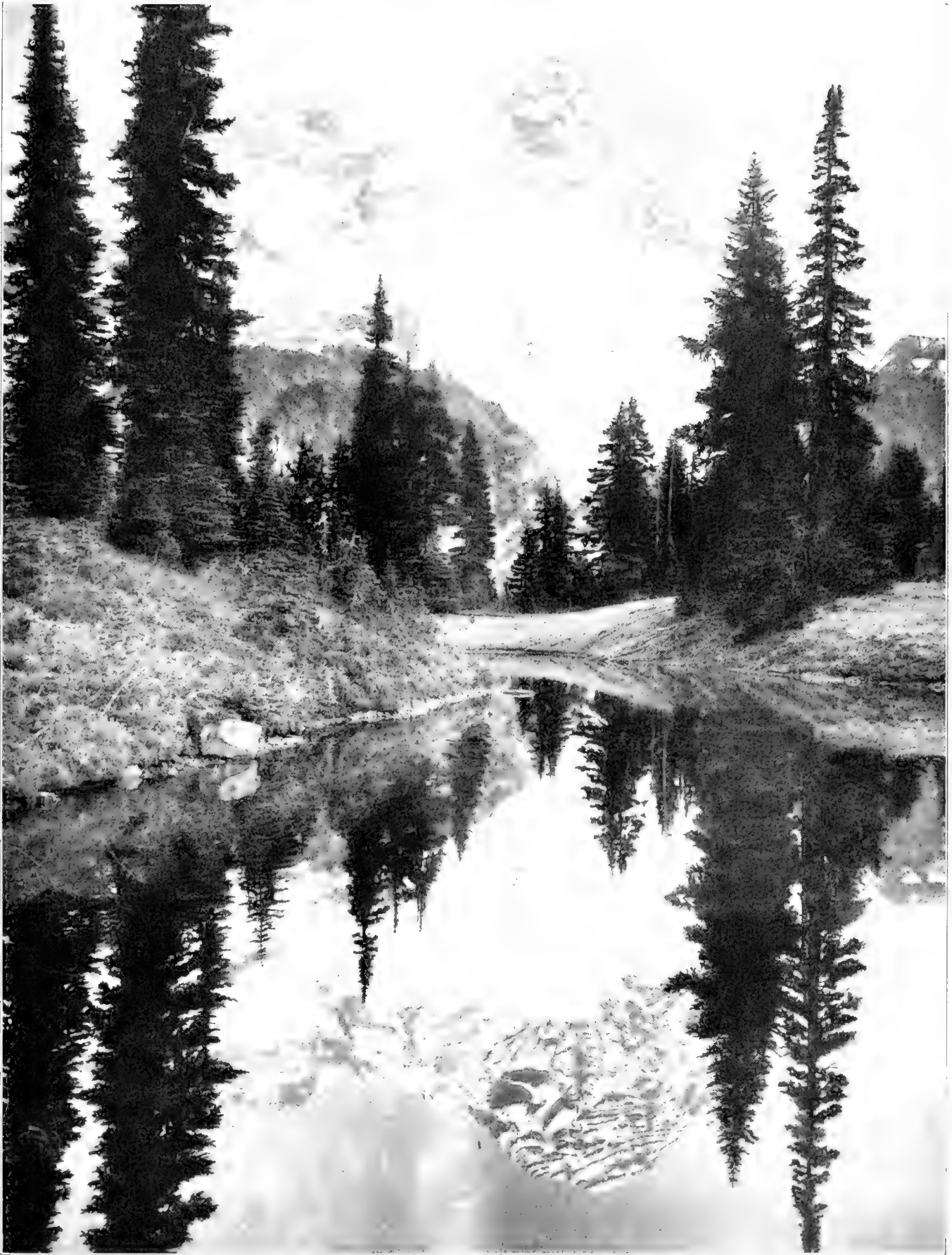
APPROVED grazing allowances for the National Forests during the present season provide for the pasturing of 8,400,155 sheep, 2,120,145 cattle and horses, and 54,680 swine. These figures, compared with those of last year, represent an approximate increase of 111,000 cattle and horses and a decrease of about 200,000 sheep.

DO you know that many birds often eat their weight in insects each day? Do you know that but for these birds, insects would make the earth uninhabitable in seven years? Do you know that the game hog, the small boy with a 22 rifle and the domestic cat destroy untold millions of beneficial birds each year?

DO you know that there are over 100,000 kinds of insects in the United States, the majority of which are injurious? Do you know that these insects cause over a billion dollars worth of damage to our crops each year, and destroy forest trees sufficient to furnish lumber for thousands of homes?

AN interesting deposit of carbonized wood, principally Sitka spruce, was recently uncovered by a party of timber cruisers near Talolah, Washington. The coal was successfully burned for several days on the camp fires of the party.

OF the 30,000,000 trees planted in the United States last year, Pennsylvania planted almost one-fourth.



REFLECTION LAKE, IN INDIAN HENRY'S HUNTING GROUND, RAINIER NATIONAL PARK

No better name could have been found for this clear, glass-like body of water—in this view mirroring "Rainier, the Beautiful"—rising in glistening splendor 14,408 feet above the sea, its white majesty vigilantly guarded by the dark forest of fir and cedar below.



A GROUP OF THE HUNTERS AND SOME OF THEIR SPOILS

Some of the school children of Dubuque, Iowa, whose good work, inspired by the Rotary Club of that city, resulted in the collection of sixty pounds of cocoons of the tussock moth. It was a competitive campaign, and the little girl whose collar is marked with a cross was the winner.

THE VALIANT HUNTERS OF THE MOTH EGG COCOONS

THE following from the *Newark Evening News* is reproduced with congratulations to the Rotary Club of Dubuque for inspiring the work in that city and to the school children of Dubuque for the fine showing they made in collecting the cocoons:

"At first glance one might easily suppose the cut is illustrative of some phase of the food campaign which is now sweeping this country. In truth it is but several stages removed, for these school children are among those in Dubuque, Iowa, whose efforts were enlisted in fighting the tussock moth.

"When the Rotary Club of that city realized the danger that was threatening their trees because of the ravages of the tussock moth, a campaign was started to collect the egg cocoons before they had the opportunity to hatch out this spring. Members of the club visited the various schools and succeeded in interesting the teachers and pupils in the undertaking. The club offered prizes for the school children who would turn in the largest number of egg cocoons. Captains were appointed in each school and the work was soon organized.

The individual and school prizes approximated \$50.

"One hundred children brought in about five bushels of cocoons, weighing over sixty pounds, and the picture shows some of the boys and girls who were prize-winners. Little Barbara Alesch, aged twelve (whose picture bears a cross), was the winner, not only of the girls' first prize, but of the second general prize in competition with the boys. When asked how she did it, she replied, 'I just took all the boys overlooked.'

"The Rotary Club has decided, if next year another similar campaign is necessary, to give each pupil twenty-five cents for each pound of cocoons gathered, in addition to the special prizes. In this way every pupil participating will receive something for his or her work. By adopting this method the expenditure of \$75 or \$100 will accomplish wonders. This year publicity through the newspapers stimulated interest, and, aside from the egg cocoons gathered, scores of people cleared up their own trees and banded them. The ten days of energetic work certainly has proved a saving of countless trees to this wide-awake city."

INSURING STANDING FORESTS

MUTUAL insurance of standing timber has recently been introduced in the United States with striking success. As with many other forms of forest development New Hampshire is the first state in which the practice has been applied. The results there have been such as to attract widespread attention among the owners of timberlands in other parts of the country and to warrant the belief that forest insurance on a mutual basis will soon become as popular here as abroad.

The Timberlands Mutual Fire Insurance Company was formed by leading lumbermen and men experienced in the handling of fire protection in the woodlands. Its operations are based on careful consideration of all available data as to the average loss over protected areas. This data came from widely scattered sources and represents the experience of successful insurance operations in foreign lands by both stock and mutual companies and by the stock companies of America. With this information as a foundation the company has been enabled to arrive at conclusions that eliminate much of the experimental work in a new enterprise of this nature and to give service at a minimum of cost and risk.

Besides giving policyholders their insurance at cost the mutual company is regarded as affording a valuable stimulus to planting and long time management of woodlands, for which adequate and continuous protection will be demanded. Of similar importance is that the insurance makes timberlands more satisfactory security for loans. Through these factors it is believed the new form of insurance will help establish a broader and more definite market for cut-over lands and plantations and thus create new values and a new source of wealth.

The New Hampshire company is now accepting applications and issuing policies covering loss or damage by fire on merchantable standing timber, young standing timber and plantations. Insurance is written on no tracts which are not adequately protected from fire by forest protective associations, the state or the owner. As another measure to minimize the hazard the company will not accept tracts which contain or adjoin recent slashings or which are exposed to undue danger from fire. The amount of insurance on any tract is governed by location and value and no line is given on any risk in excess of that warranted by the assets of the company. With this limitation timber may be insured for part or full value, as desired by the owner. Merchantable timber is insured on the basis of its stumpage value per thousand feet or per cord, while young growth and plantations are covered on an agreed value per acre.

As a mutual company the organization has for its aim the granting of insurance at actual cost, eliminating the agents' commissions and other items that must be added to the charges of companies operating for profit. For the current year the company has established a base rate of two per cent. premium deposit, with the announcement that this is several times the average annual percentage

of loss experienced over a number of years in standing timber under organized protection. Each premium paid is treated as a cash deposit. Such portion of this deposit as may not be absorbed by losses, expenses and necessary reserves will be returned to policyholders in the form of dividends. In this way it is claimed that the company places at the service of timber owners facilities for insuring standing timber at the lowest possible cost, hitherto unobtainable in this country.

Among the arguments set forth in behalf of this form of insurance are the following:

It guarantees owners the money value of their young growing timber which otherwise, if fire-killed before reaching merchantable size, becomes a total loss.

It makes standing timber a more acceptable security for money loans and thereby increases the owner's borrowing capacity on timber pledged as collateral.

It is a guarantee for money spent in making plantations and gives protection which warrants planting on a more extensive scale than has heretofore been practiced.

It is a stimulus to continued and adequate forest protection, as reduction of hazard will result in reduction of insurance cost.

The majority of the organizers and directors of the company are owners and operators of standing timber, who have been active for years in promoting forest protection. They believe that mutual insurance is now both safe and economical and that indemnity for fire losses by means of insurance is of importance next to fire protection itself. In the formation of the company there have been no expenses for promotion and organization. The only charges incurred were those for the charter and license fees.

Evidence of the high character of the organization is afforded by its personnel. As its president the company has W. R. Brown, president of the Berlin Mills Company, of Berlin, N. H., a director of the American Forestry Association and president of the New Hampshire Timberland Owners' Association, who conceived the idea and is chiefly responsible for its successful development. Other officers are: Vice president, E. E. Amey, of the American Realty Company, Portland, Me.; treasurer and manager, S. L. de Carteret, Portsmouth, N. H.; secretary, T. E. Sears, of Gilmour, Rothery & Company, Portsmouth, N. H. In addition to President Brown and Vice President Amey the directors are:

Martin A. Brown, Woodstock Lumber Company, Boston, Mass.; George B. Leighton, N. H. Forestry Commission, Dublin, N. H.; George Hewitt Myers, Washington, D. C.; H. G. Philbrook, Connecticut Valley Lumber Company, Boston, Mass.; E. Bertram Pike, Pike Manufacturing Company, Pike, N. H.; Weld A. Rollins, Lawyer, Boston, Mass.; L. S. Tainter, Publishers' Paper Company, Boston, Mass.; C. C. Wilson, Odell Manufacturing Company, Groveton, N. H.; F. J. Suloway, Lawyer, Concord, N. H.

EDITORIAL

HAWAIIAN FORESTS

HAWAII has a general system of publicly owned forest reservations, numbering 39, and covering 798,344 acres, of which 31½ per cent. is still private holdings. These forests are indispensable to the prosperity of the islands in protecting the slopes for the conservation of water for irrigation on the dryer lower slopes and flats. The Board of Commissioners of Agriculture and Forestry in 1915 appointed Charles S. Judd, a technical forester with eight years' experience in the National Forest Service, as superintendent of forestry to succeed Ralph Hosmer, also a trained forester, under whom the work had been organized, and who is now director of the College of Forestry at Cornell. Rules have been adopted protecting the reserves from illegal cutting or injury to timber, requiring permits for stock grazing and for hunting wild animals, prohibiting the pollution of streams and preventing the squatting upon government lands. The water supply of the city of Honolulu is given special protection, no one without a permit being allowed on this area. Extensive fencing projects have been undertaken against stock. A volunteer fire-warden system is well established and rendering efficient service, as the damage done by fire is very serious and universally recognized.

It is estimated that the algaroba, our native mesquite, now covers 80,000 acres of the dryer lands. Forest extension is being pushed by the introduction of other valuable trees, the maintenance of nurseries for tree seedlings, by planting on government lands and by giving advice on methods of tree cultivation. Eucalyptus species give great promise. Many Philippine species are being tested and others from India, New Zealand and Jamaica. An arbor day has been established since 1905. Within two years 1,803,728 trees have been planted on private lands, half of which were *eucalyptus robusta*, or swamp mahogany, which grows anywhere, withstands wind, produces good timber and fuel and is easily propagated from seed. In other words, this great undertaking is being conducted on a thoroughly efficient and progressive basis, free from politics, and if continued under its present form of organization by which a trained technical and business expert is given full charge of the activities of the department, with a board of directors to review his work and advise him, it is inevitable that the public will reap increasing benefits and that the economic objects of the administration will be fully attained.

THE NEW STANDARD OF PUBLIC SERVICE

THIS generation is witnessing not alone a gigantic struggle between the ancient superstition of autocracy and the young and vital principle of democracy and equality, but coupled with this in a manner most confusing to clear thinking is the question of harmonizing the apparently opposing tendencies of freedom and efficiency.

In a war which demands the concentration of every ounce of the nation's strength, and the rapid and complete organization of her entire economic structure, we have recognized, as have our allies, the need of surrendering our individual liberty of action to the directing genius of experts in every line. For perhaps the first time in our history the popular doctrine that the versatile American can turn his hand to anything at a moment's notice has, at least in military affairs, given way to the principle of thorough preparation by training for the duties ahead.

The Prussian State has for two hundred years recognized that national efficiency is based on thorough preparation, both in economic and military matters, but has held that such preparation could only be secured by an autocracy, in which the rulers and the ruling classes possessed the expert knowledge, combined with the su-

perior wisdom which enabled them to guide the obedient masses to the attainment of world domination. The grim and blighting success which has attended their aims has taught the world not merely the necessity for crushing once and for all a system of government which gives the soul and willpower of a great nation into the keeping of fiends devoid of human compassion, but it has brought out the fact that efficiency, serving the common good and directed by the combined will and intellect of democracy, is the only protection against brutal aggression.

How does this lesson strike home to us? National efficiency in private business has been maintained on a fairly high plane,—but, in public affairs we have frankly failed in a large measure. In the place of economy and skilled direction of vast public enterprises, we have endured conditions of unspeakable incompetency, waste and vicious graft. Why is there such a contrast? How long can we tolerate conditions which we now know to be not only unscientific, but suicidal?

The cause is not far to seek. We have applied the idea of freedom and equality to our management of public affairs in such a manner that the only qualifications for responsible positions were popularity and the ability to swing votes. Offices went as rewards to political ad-

herents, or as bribes for future favors, and the fitness of the appointee for the work was a secondary consideration. Even in the National Government, certain departments and bureaus were notoriously dominated by these standards, and the term "government official" was a synonym, in the popular mind, for laziness, incompetency, and even graft.

Very slowly, but with increasing momentum, our great and unwieldy democracy is coming to the realization and acceptance of a new and better standard of public service. This found its first feeble beginning in what was termed "Civil Service Reform", which sought to establish standards of efficiency, and to substitute merit and continuous tenure of office for subordinates, in place of the spoils system.

Soon there grew up in certain departments of the National Government standards of scientific attainment, requiring educational training of a high order, and attracting men to public work, not through the avenue of political preferment, but on the solid basis of a professional and business career. Engineers, both within and without the United States Army, geologists and topographers, agricultural experts and foresters—a great army of trained men has grown up almost over night in our National Service—and now, when we suddenly awake to our needs, it is these public servants of the new type who have taken the leadership in organizing not merely the army, but the food campaign and many other vital activities. Joined with them are the specialists drafted from private business.

The lesson which the National Government has so nearly learned, in the substitution and protection of a force of skilled men in place of the outgrown system of political appointees, is beginning to make headway also in state and municipal affairs. But here the powers of politics—the old, inefficient system of partisan government—is still strongly entrenched, and it will take much study and effort to establish practical systems under which the grip of the spoilsman can be shaken from the throat of the public, and at the same time the government of city or state be kept responsive to popular will.

It is significant that in cities, the form of government most successful to date is the commission plan, under which a body of several citizens is chosen by ballot, to serve as a governing board, with power to appoint all subordinates. A still greater improvement is

the authorization of employment by them of a city manager. This plan is identical with that followed by practically all large private business corporations—universally adopted by them because it has been found to secure the best results. Under its operation, experts are retained to manage each special department of work, and are paid adequate salaries.

But, when we come to state organization, we find no consistent policies developed as yet. The machinery is too complicated for the public to grasp and solve at once. The usual form of organization is the outgrowth of haphazard development, and combines appointment by the governor, for some positions, with the creation of boards of directors for other lines of work. The executives, in seeking light on this question, naturally gravitate towards enlargements of their own powers, the abolition of numerous boards, and the building up of centralized forms of government largely autocratic in character, and thoroughly dominated by the principle of political control. Can the various states find ways of solving this problem, which shall secure in state affairs the same efficiency and high standards of service that are now rapidly becoming established in National and Municipal Government?

If state forestry is taken as an example, the experience of numerous states is wholly in favor of the plan of retaining boards of directors over distinct departments of state work. But these boards must recognize that the executive work of the department must be placed by them on the shoulders of a trained official. It is the failure of boards to do this that has discredited them in many instances. Fortunately, forestry boards, with few exceptions, have followed correct principles, and the work of the trained men so selected speaks for itself in every state so managed. So conspicuous is the success of state foresters selected under this plan of organization, and so great is the contrast in states in which other plans have been followed, that in this time of self-examination and sincere effort the states cannot afford to overlook or neglect the lesson taught. Much remains to be learned, but the principle of a board of directors, properly chosen, must not be cast upon the scrap heap in favor of centralized control. Who knows but that in the board idea properly developed we may not have after all the solution of the problem of harmonizing popular liberty with highest efficiency in a democracy?

OUR NATIONAL MEAT SUPPLY THREATENED

IN a recent issue, AMERICAN FORESTRY called attention to the probable effect of the new 640-acre stock grazing homestead law upon the grazing industry of the West. This law was based upon a fundamental economic error, in assuming that 640 acres of non-irrigable land was sufficient to support a family by its use for grazing. It is universally known in the West, and as freely admitted, that this cannot be done. The carrying capacity of the arid range to which this law applies is but one cow to from 20 to 40 acres. One hundred beef-

cattle yield only a fair living, yet this minimum requires at least 2,000 acres and more often twice that area.

The public officials charged with the administration of this law are as fully aware of this situation as are the local residents, but true to the ancient doctrine of *laissez-faire*, they shrug their shoulders and express the opinion that the success or failure of the homesteader is none of their concern, provided they live up to legal requirements in proving up.

In a recent article published in the Albuquerque, N. M.

Morning Journal the following summary appeared:

"The entrymen who will file on these lands consist of three classes: a small portion of them are looking for tillable soil on which to make a home; about one-third of them want to take up 640 acres *as a nucleus* for a small stock ranch, while the greater number are persons who hope to prove up on 640 acres and then sell at a good price." Continuing, this paper says: "The assassination of the late Thomas Lyons of Grant County is said to have been due to a feud he had with several 640-acre entrymen who had sent him word that he must buy them out if he wanted to keep his range intact."

The situation revealed by this frank statement brings out in clear relief the evils which will follow the application of this law. Not ten per cent of the applicants can actually support themselves from the grazing on 640 acres, hence the sole object of the filing will be to obtain private title to government land, in order to hold up some one who can make use of it, by "selling out at a high price."

The grazing business requires large units, and is the only possible use for most of this land. Once the land is fenced off by numerous 640-acre land speculators, whose sole hope of return lies in selling to these stockmen, the grazing business is immediately disrupted on an enormous scale, and cannot be resumed until after the three-year period required for the applicants to prove up, and the completion of negotiations for the purchase of the lands. But if these lands are held at speculative prices, either the overhead charges for capital and interest on the grazing business will be enormously increased, or the stockmen will be driven out at least temporarily. Ultimately, by the ruthless operation of economic laws, grazing units will be reassembled of sufficient size to permit the industry to resume its functions.

The worst effects of this speculative raid upon the arid public lands was postponed by the requirements that the officials of the Interior Department must first examine and classify the land as non-irrigable, non-timbered, and chiefly valuable for grazing, and the raising of forage crops. But the delays caused by this safeguarding of public interests are proving too irksome for the speculators, and by a recent amendment offered by a southwestern senator, all barriers are swept away and the applicant can file on any unreserved public land regardless of its character, whether timbered or otherwise. Should this amendment pass, the flood-gates are open and

the public lands will disappear over night in the worst scramble the West has ever seen.

We hold no brief for the cattle baron or sheep man, who in the past has monopolized the free range, fenced up the waterholes and driven out the homesteader by intimidation and violence. He should long ago have been made to pay into the public treasury the value of the grazing privileges on public lands, just as today he is paying for his grazing rights on both National Forests and Indian Reservations. But the stockmen fought this measure—and now find themselves facing ruin on the other horn of the dilemma.

In this contest for private gain, where does the public profit, and what thought is being devoted to the stimulation of the meat production on the western range? Whatever other effects the Fall amendment to the stock grazing bill will have, *it will at once and seriously decrease the production of meat, at the very moment when our national existence is threatened, and the triumph of human liberty and democracy depends directly upon increasing the food supply.* And to add a touch of satire to this vicious legislation, the amendment recently passed the Senate as a rider to the food bill.

How long will the nation continue to close its eyes to the fact that public welfare cannot always be best served by permitting the unrestricted operation of private greed? The new doctrine of public supervision and regulation for the good of the whole is winning its way slowly. The National Forests are the bulwarks of these principles. The history of the public range outside of the Forests may well be studied as an object lesson in the effects of unrestrained individual initiative.

This enormous and costly economic readjustment of the business of meat production on the Western ranges would probably have had to come some time, for the reason that the political pressure by states and localities seeking development and increased state revenue from taxation find no balancing or opposing force in the Department of the Interior, whose traditional policy is to dispose as rapidly as possible of public lands within its jurisdiction.

But that this movement should have been permitted to come to a head just when its disturbing effects upon meat production are most serious and keenly felt—and that the very bill passed to conserve the nation's food supply should be selected as the vehicle for its passage, betrays the utter disregard for public welfare and short-sighted selfishness inherent in the doctrine of individualism. Such measures will not aid us to win the war.

THE College of Forestry of the University of Washington, one of the earliest of the forestry schools in the West, has been forced by the war emergency to entirely change its scholastic plan. The calendar for the coming year just issued, announces that all registrations have been postponed in this college until October 1, and that the university has elected for the period of the war to substitute the four quarter plan for the college year instead of the usual semester plan.

AS an interesting development in the wartime use for wood, it is stated by the authorities that the mobilization camp at the State Fair grounds, Syracuse, where 25,000 men are quartered, consumes more than 33 cords of wood a day for cooking purposes, or a total of 1,000 cords a month. This would represent the material obtained from necessary thinning and improvement cuttings in half a dozen good-sized New York farm woodlots.



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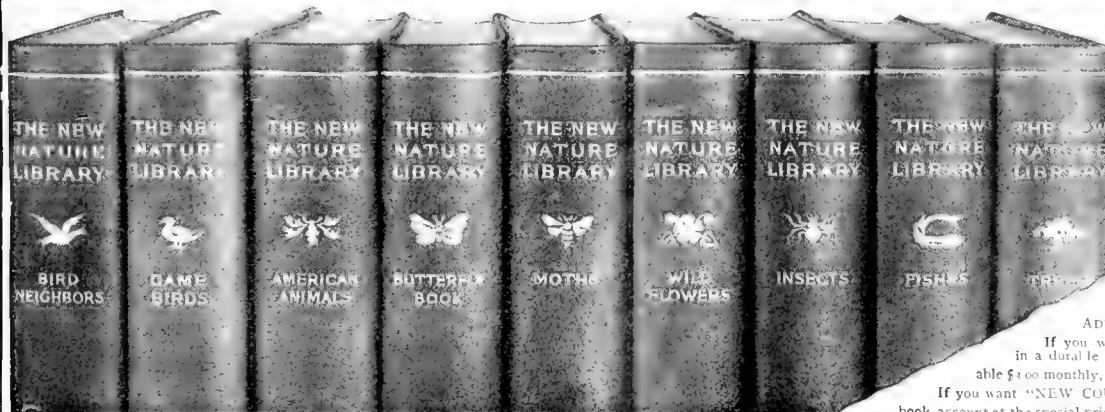
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BOOK REVIEWS

French Forests and Forestry, by Theodore S. Woolsey, Jr. John Wiley & Sons, Inc., New York City. Price, \$2.50.

This work embodies the results of a study of the more important phases of forest practice in Corsica, Algeria and Tunisia. The author has not attempted to present a complete investigation of forestry in all its ramifications, but has rather aimed to set forth the essentials of French methods which might be applied directly in the United States, or would otherwise prove of value to English speaking foresters. His wide experience and studies abroad include not only Continental Europe and the French Dependencies described in the book, but also forest management in British India as well. Mr. Woolsey makes, in French Forests and Forestry, a most valuable contribution to the forest literature of the day.

1000 Hints on Flowers and Birds, by Mae Savell Croy. G. P. Putnam's Sons, New York City. Price, \$1.50.

A very serviceable book, written for those who are interested in flower culture and in the establishment of wild life about the home, and so handled that it is of equal value to those who must live in cities and are limited in their efforts to a small back yard or a porch garden, and those more fortunate ones living in the country or the suburbs, who may spread themselves in planning and beautifying their gardens and grounds. The instructions for flower culture in Mrs. Croy's book are briefly and clearly given, and the information, classified under appropriate headings and exhaustively indexed, will prove invaluable to the flower lover and gardener.

The Bird Study Book, by T. Gilbert Pearson. Doubleday, Page & Company, Garden City, N. Y. Price, \$1.25

To those who are interested in bird life and who desire to acquire a greater familiarity with the habits and activities of wild birds, this little book, charmingly illustrated, will prove a mine of pleasure and information. It is not intended so much for the advanced student of ornithology as for the beginner, taking up briefly the classification of birds, their form, color, distribution, migration, songs and foods, and it answers many questions which naturally occur to the student of bird lore. To know birds is to love them, and to be introduced to them through the medium of Mr. Pearson's book is to insure that love born of intimate knowledge.

An Introduction to Forestry for Young People, by Sir Andrew N. Agnew, Bart, Douglas & Foulis, Edinburgh.

This little book has been issued by the Royal Scottish Arboricultural Society, written by its president, with the object of



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arousing an interest among children in the important subject of forestry. The limited edition is being sent to masters of rural schools in Scotland as a means of broadening interest in this phase of education, and determining just how great a demand there may be for it. The Scotch Education Department has asked its inspec-

tors to bring the book to the notice of teachers or managers, and if this is done its purpose will have been accomplished, for it will surely inspire the intelligent interest hoped for by its eminent author.

(Books and periodicals indexed in the library of the United States Forest Service.)

CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY, CANADIAN SOCIETY OF FOREST ENGINEERS

The resignation of Mr. P. Z. Caverhill as Forester in charge of timber surveys in New Brunswick, and his return to the British Columbia Forest Service are announced. New Brunswick is very unfortunate to lose so good a man and one who had made such good progress in his work. Mr. Caverhill's mapping and estimation of the forest resources of New Brunswick and the classification of its lands was making rapid progress and is of great value and the cost of the work was exceptionally low. It is to be hoped that a successor will soon be chosen and that the work will be brought to completion.

The Government of Newfoundland is expected to pass a bill permitting the export of pulpwood to the United States. Large quantities of wood were cut to be sent to England and France, but the difficulty in getting ships makes its transport impossible.

The Canadian Government some time ago took up the question of cheap wooden houses to replace temporarily the homes destroyed by the Germans. Some samples were made up and sent to Paris, where they were set up and attracted a good deal of attention. The French Government suggested several changes which will make the houses more expensive and Canada is ready to supply them. The long duration of the war has, however, side-tracked the matter for a time.

The British Columbia Forest Branch recently sent a carload of British Columbia timber as a present to the Toronto Technical School. This will serve to familiarize the young men being trained with that class of timber and when they later need to specify lumber in their work they will use western stock.

Prof. J. M. Swaine, Entomologist to the Dominion Entomological Department, has started on a trip through part of Quebec to study the cause of the dying of a great number of balsams. The trees turn brown and die. The same thing was noticed in France some 12 years ago and was described as a fungus disease and named *Phoma Abietina*. Mr. Lee, of the Forest Products Laboratory, will accompany Prof. Swaine, and they will commence their work in collaboration with the Forest Service of Quebec on the lands of the River Ouelle Lumber Company.

Dr. C. D. Howe, of the Commission of

Conservation, has finished his reconnaissance survey of the cut-over lands on which he is making an estimation of present stand, reproduction and probable rate of growth and yield. This is a very important matter, as the ideas of owners of timberlands are very vague if not altogether erroneous as to the future cut on their lumbered lands.

In this connection it is very interesting to note the increases in amounts of pulpwood being exported to the United States and the rapid increase in purchase of Canadian timber lands by American mills. The statement has been made that New York is practically at the end of her pulpwood supply and must look to Canada for the future. As the export of unmanufactured wood is prohibited and the amount of timber land held in fee simple is not very great proportionately, the New York mills had better begin to look out for the future. The consumption of pulpwood in Canada is rapidly increasing and owners who understand conditions are increasing their holdings and commencing to reforest. It is just as well to shut the stable door before the horse escapes.

The number of foresters in Canada going to the front continues to grow and the various services are getting short handed. The men who have gone are doing good work on the other side and the American units going over now will be very welcome.

Considerable work is being done this summer in the Alberta Inspection District of the Dominion Forest Service. Supervisor MacFayden has left to take charge of the Fort George District in British Columbia. A telephone line forty-two and one-half miles long has been commenced from the Headquarters at Entrance northward along the lower trail, the first twenty-one miles will be pole line and the balance will be a tree line. The poles are being treated with Carbosota. The line will connect several points where there are stations and also with two lookout stations. Inspector Manning, of the Brazeau Forest, met with an accident when his gasoline "speeder" telescoped a backing engine. The section foreman who was with him is laid up for repairs and only part of the "speeder" has so far been collected. In the Clearwater Forest a five-roomed house with barn and out buildings is being constructed at Nordegg Ranger Station. The bunkhouse has been nicknamed "The Ram

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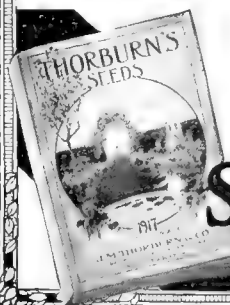
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Forest Botany

Deutsche dendrologische gesellschaft Mit-

Pasture." A new trunk road is being built and this work will be done in the best manner possible so as to serve as a model both as to work and costs. In the Bow River Forest forty-five miles of telephone line have been built. A very successful ranger meeting was held at Morley when all sorts of problems were discussed and the men had an opportunity to get together. The Lesser Slave Forest is the only one which has been troubled by fire this summer. Assistant Director of Forestry T. W. Dwight has been making a tour of inspection.

Prof. W. B. Millar, of the University of Toronto, who resigned recently is in training at Fort Niagara, N. Y.

Messrs. Benedict and Lafon, of the Brit-

ish Columbia Forest Service, have left to go overseas with U. S. Forestry Units.

Dr. Fernow and Clyde Leavitt, of the Commission of Conservation, are on a visit to Dr. C. D. Howe, at his camp on Lac Edward, Quebec, and will inspect the nurseries, plantations and experimental work of the Laurentide Company, near Grand Mere. In 1908 this company planted some Scotch Pine transplants, about three or four years old, received from Mr. E. J. Zavitz, Provincial Forester of Ontario. These trees have done well and average thirteen to fourteen feet in height. Last year some of them had cones, and the seed from one of these was planted this spring and has germinated nicely. Nearly all the trees in the plantation will have seed this year.



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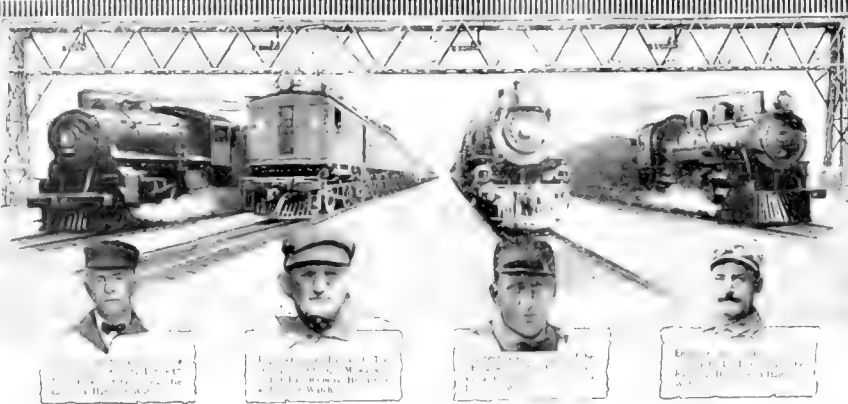
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New cypress inspection rules, by National hardwood lumber association, p. 50.

Savannah naval stores review, June 23, 1917.

Germany could make enough rosin for its uses, by E. R. Besemfelder, p. 11, 18.

Southern lumber journal, June 16, 1917.—Lumber and the national defense, by R. S. Kellogg, p. 36.

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Timberman, June, 1917.—Coast logging methods in the Philippines, p. 38; Plans and specifications for the standard Douglas fir steamship, p. 40-46; The use of wood for treenails, by M. B. Pratt, p. 46-7.

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Veneers, July 1917.—Veneered cabinets in music field, by G. D. Crain, Jr., p. 13-14; Veneered cigar boxes, p. 22-3.

West Coast lumberman, June 15, 1917.—Character and distribution of the 1916 lumber and shingle cut of Washington and Oregon by producing and consuming regions, by Howard B. Oakleaf, and Clark W. Gould, p. 22-7.

Wood-worker, June, 1917.—Utilizing waste: baling shavings, by Waldo Clement, p. 25-6.

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American forestry, July, 1917.—Can and cannon; drier and dreadnaught, by Norman C. McLoud, p. 389; Forest regiment off for France, p. 386; Lumber for war-time uses, p. 397; Lumber for an army cantonment, p. 398; The extension of national forests in Colorado, by Herman H. Chapman, p. 403; Midsummer flowers, by R. W. Shufeldt, p. 403; Forestry progressing in China, p. 407; Forms of leaves, p. 412; Ornamental shade trees and their care, by Homer D. House, p. 44; The wrens, by A. A. Allen, p. 419; The deadly manzanillo, by Frank Coyne, p. 423; Window garden attraction, by C. W. H. Douglass, p. 424; A giant cactus, by Stanley F. Wilson, p. 427; Some of the wood-side foods, by Bristow Adams, p. 428-9; Some interesting trees of singular

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Canadian forestry journal, June, 1917.—On sea-swept Sable Island, p. 1137-9; Forestry work for women, by May Sutherland, p. 1139-40; Can Canada sell John Bull his wood supply? p. 1141-2; Ontario's forest protection work, p. 1143-5; Nature's warfare in field and forest, by Ellen R. C. Webber, p. 1151-56; Turning the tree to new account, by John S. Bates, p. 1160-2; A new log boom for rough waters, p. 1164; Peat logs as sources of fuel, by J. M. Macoun, p. 1165-6; State forestry in Ireland, by H. R. MacMillan, p. 1168-72; How U. S. deals with settlers' fires, p. 1174-5; New devices in protective work, by Coert Dubois, p. 1178-9.

Conservation, July, 1917.—Combating forest fires; protect young forests, by R. D. C., p. 26, 28.

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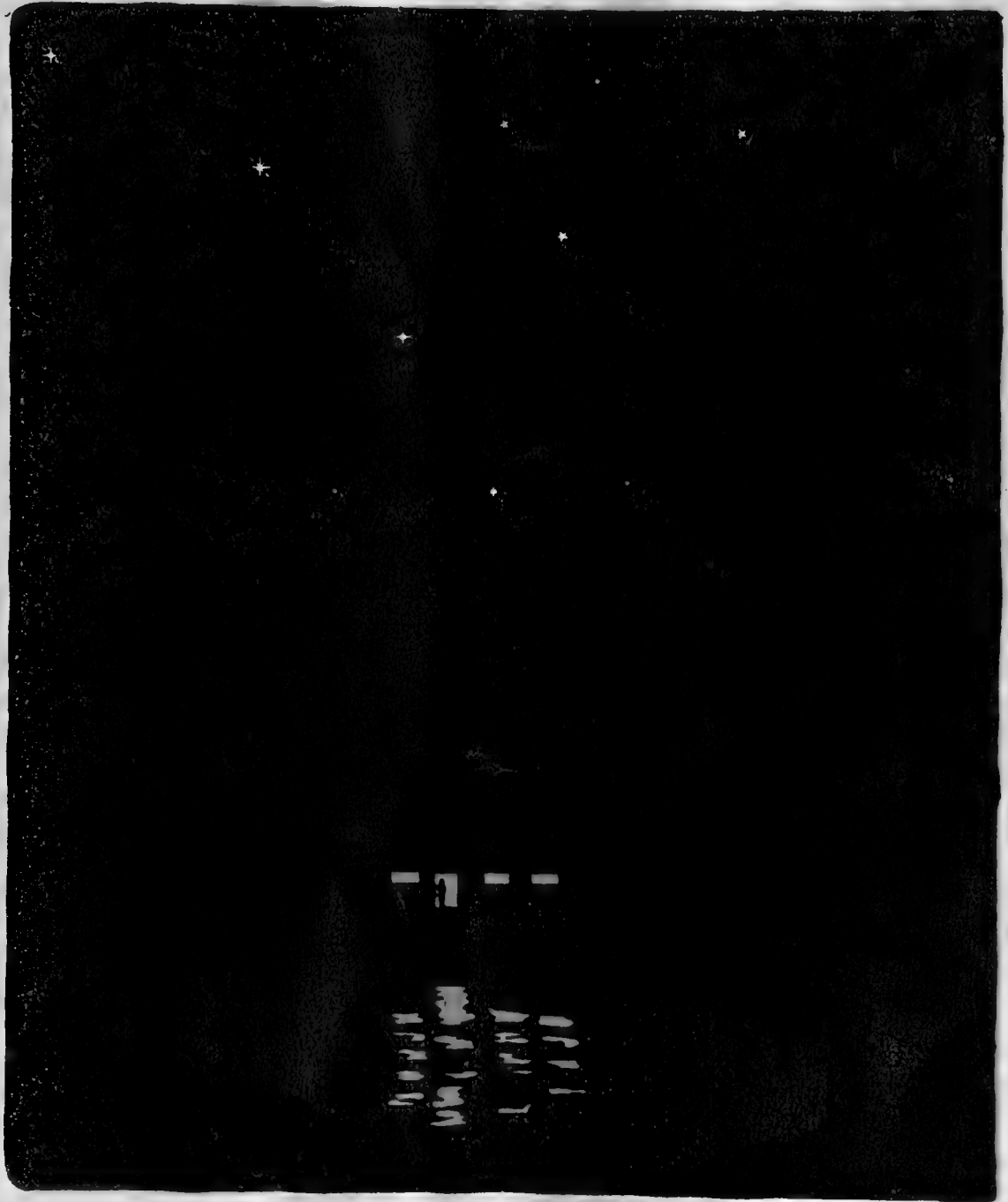


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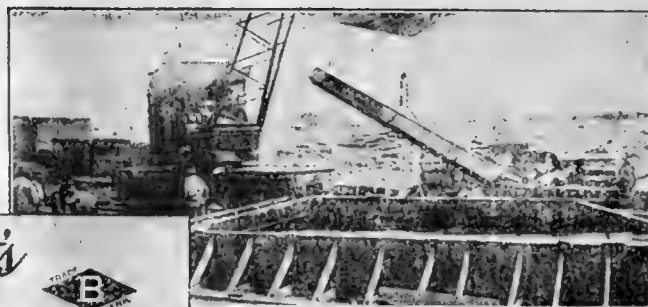
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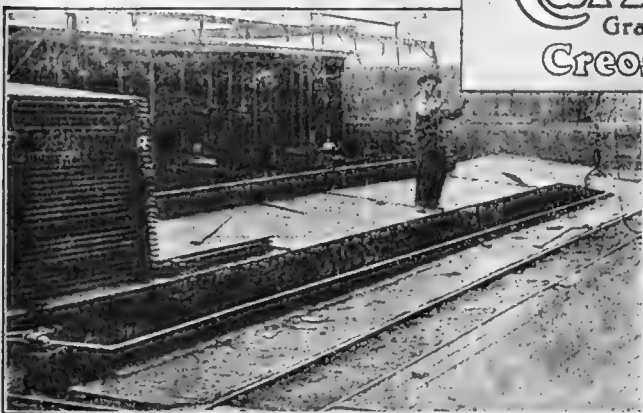
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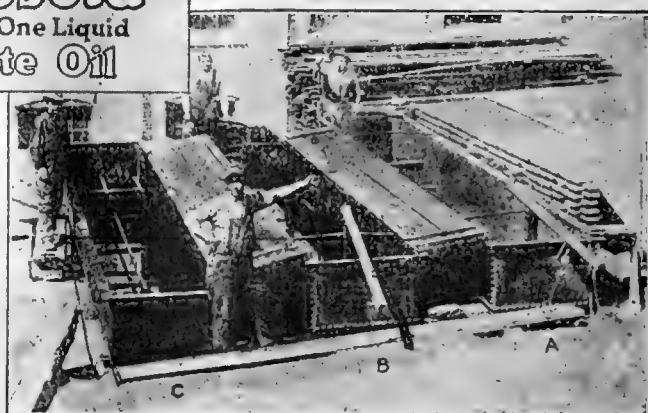
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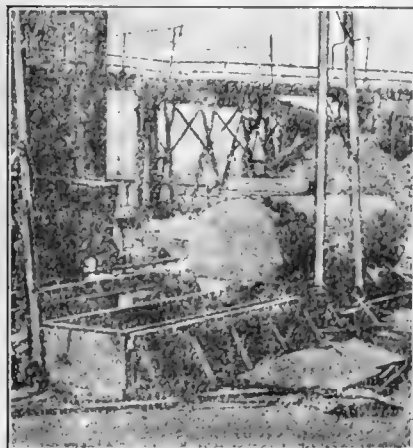
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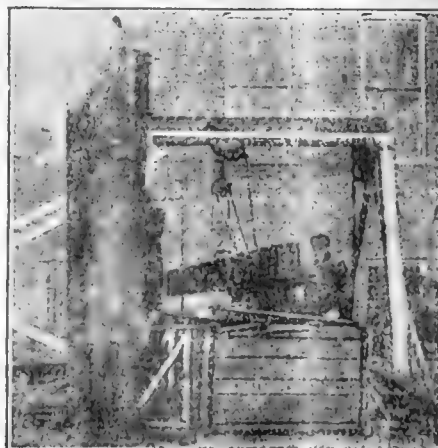
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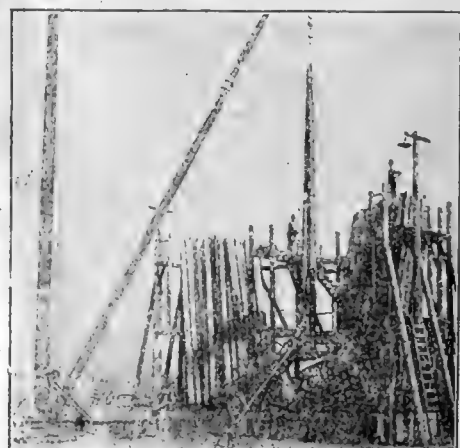
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THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

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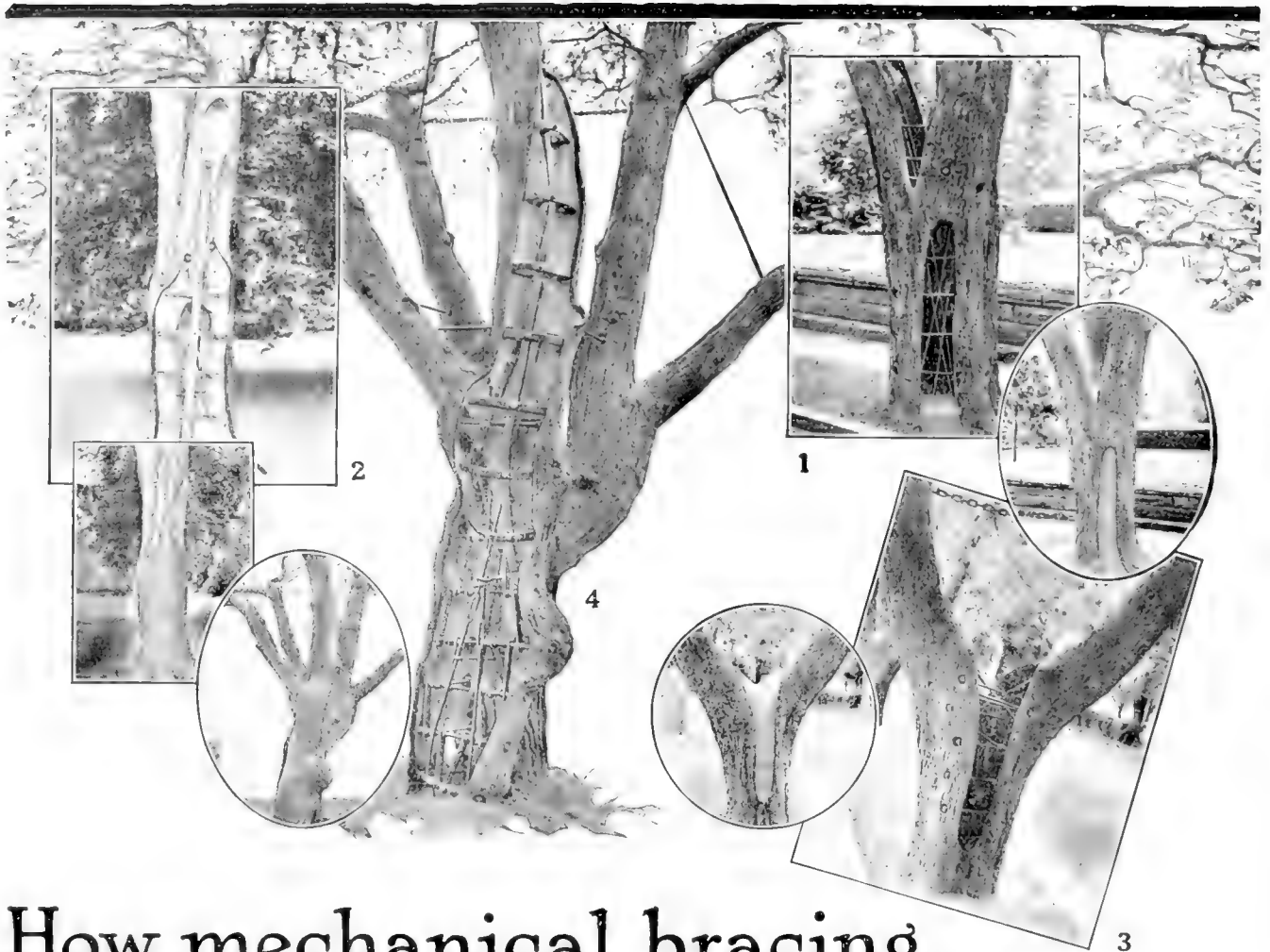
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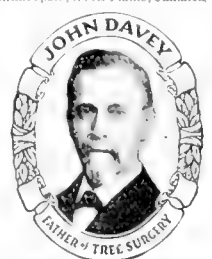
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NATIONAL FOREST TIMBER FOR SALE

Location and Amount.—All the merchantable dead timber, standing or down, and all the live timber marked or designated for cutting on an area embracing about 3400 acres in Townships 1 and 2, R. 4 E., of the Basis Line, Smith Creek and Hopper Camp Branch watersheds, Cherokee-Georgia National Forest, Tennessee, estimated to be 4,800,000 feet B. M., more or less, of saw timber of poplar, white pine, shortleaf pine, white oak, red oak, black oak, scarlet oak, chestnut oak, hickory, basswood, ash, beech, and other species, 2,500 cords of chestnut acidwood, 600 chestnut oak ties, 460 cords of hemlock, poplar and basswood pulp, 12,000 locust posts, 340 chestnut poles, and 560 tons of hemlock and chestnut oak bark.

Stumpage Prices.—Lowest rates considered: Shortleaf pine, and chestnut oak saw timber, \$2 per M; poplar saw timber, \$8 per M; white pine saw timber, \$7 per M; basswood and ash saw timber, \$6 per M; red oak and white oak saw timber, \$5 per M; black oak, scarlet oak, beech, hickory, birch, gum, and other species, \$1 per M; hemlock, basswood, and poplar pulpwood, \$1.25 per cord; hemlock and chestnut oak bark, \$3 per ton of 2240 lbs.; chestnut acidwood, \$1.50 per cord; chestnut oak hewn ties, 15 cents each; locust posts, 5 cents each; chestnut poles, 30 ft. long, 30 cents each; 35 ft. long, 50 cents each; 40 ft. long, 75 cents each; 45 ft. long, \$1 each; 50 ft. long, \$1.25 each; 55 ft. long, \$1.50 each; 60 ft. long, \$1.75 each.

Deposit.—With bid \$500 to apply on purchase price if bid is accepted, or refunded if rejected. Ten per cent may be retained as forfeit if the contract and bond are not executed within the required time.

Final Date for Bids.—Sealed bids will be received by the District Forester, Washington, D. C., up to and including September 10, 1917. The right to reject any and all bids is reserved. Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, Washington, D. C., or the Forest Examiner in Charge, Blue Ridge, Ga.

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SALE OF TIMBER, WHITE MOUNTAIN APACHE INDIAN RESERVATION

SEALED BIDS, MARKED OUTSIDE "BID," White Mountain Apache Indian Reservation, "BID," and addressed to "The Commissioner of Indian Affairs, Washington, D. C.," will be received until 12:00 o'clock noon, Eastern Time, Wednesday, October 1, 1917, for the purchase of timber upon about 68,000 acres within Townships 8 and 8½ North, Ranges 23, 24, 25 and 26, and Townships 9 North, Ranges 24 and 25 East, G. & S. B. P. M., Arizona. The sale embraces approximately 400,000,000 feet of timber (about 35 Western Yellow Pine and 5 to 5% Douglas Fir and other species). Each bid must state the amount per thousand feet, Scribner decimal C. log scale, that will be paid for timber of all species cut prior to October 1, 1921. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs by three year periods, in accordance with operating and market conditions. No bid of less than three dollars per thousand feet for all species within the sale area for the first period will be considered. Each bid must be submitted in triplicate and be accompanied by a certified check on a solvent National Bank, in favor of the Superintendent of the Fort Apache Indian School, in the amount of Five Hundred Dollars. The deposit will be returned if the bid is rejected, but ten per cent of the required contract and bond are not executed and presented for approval within thirty days from such acceptance. If the bid is accepted and the contract and bond executed, the deposit will be applied as an advance payment on the purchase price. The right to reject any and all bids is reserved. For copies of bid and contract forms and for other information regarding the offering, application should be made to the Commissioner of Indian Affairs.

The Department of Agriculture has advertised a tract adjacent to the Indian Reservation containing approximately 235,000,000 feet of timber. The Indian timber and the National Forest timber are being advertised at the same time with the understanding that the purchaser of these tracts may log them together. Information as to the National Forest timber may be obtained from the District Forester, Albuquerque, New Mexico, Washington, D. C., August 27, 1917. CATO SELLS, Commissioner of Indian Affairs.

235,000,000 FEET

NATIONAL FOREST TIMBER FOR SALE

LOCATION AND AMOUNT.—All the merchantable dead timber standing or down, and all the live timber marked or otherwise designated for cutting on an area embracing about 55,200 acres in T. 10 N., Rs. 23 and 24 E.; T. 9 N., Rs. 23, 24, and 25 E.; T. 8 N., R. 23 E.; and the unsurveyed land in approximately T. 8 N., R. 24 E., G. & S. R. P. M., within the Sitgreaves National Forest, Arizona, estimated to be 235,000,000 feet B.M., more or less, of western yellow pine, Douglas fir, Mexican white pine, cork bark fir, and Engelmann and Colorado blue spruce. Approximately 95% western yellow pine.

STUMPAGE PRICES.—Lowest rate considered \$2.25 per M feet for all species, rate to be readjusted October 1, 1924, and every three years thereafter until end of sale.

DEPOSIT.—With bid, \$10,000, to apply on purchase price if bid is accepted, or refunded if rejected. Ten per cent may be retained as forfeit if the contract and bond are not executed within the required time.

FINAL DATE FOR BIDS.—Sealed bids will be received by the District Forester, Albuquerque, New Mexico, up to and including October 24, 1917.

The right to reject any and all bids is reserved.

Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, Albuquerque, New Mexico, or the Forest Supervisor, Snowflake, Arizona.

The Commissioner of Indian Affairs is advertising a body of timber on the White Mountain Indian Reservation estimated at 400,000 feet more or less adjoining the above advertised area on the Sitgreaves National Forest. The conditions of contract and conditions on the ground permit the logging of both areas as one operation aggregating over 600,000 feet. Full information concerning the character of timber on the Indian Reservation, conditions of sale, deposits, and the submission of bids can be obtained from the Commissioner of Indian Affairs, Department of the Interior, Washington, D. C.



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AMERICAN FORESTRY

VOL. XXIII

SEPTEMBER 1917

NO. 285

THE FIRST FOREST REGIMENT GOES ACROSS

They've changed the Hun's ships names around;
Send us along, boys, send us along!
They didn't like Teutonic sound.
Send us along!
We're overdue beyond the seas,
To hold us here is just a tease,
So send us over, if you please,—
Send us along, along!

Chorus:


As "Leviathan" the "Vaterland"
Will gather no more moss;
From "Hamburg" to the "Powhatan"
Our gain is Prussia's loss,
But we don't give a rip
For the name of the ship,
So long as we get across!

We itch to get there on the ground;
So send us along boys, send us along!
Right in the scrap we would be found;
Send us along!
We do not look for any ease,
We'll work at first among the trees,
Then we'll fight in the final squeeze,
So send us along, along!

Chorus:

"Susquehanna" exchanged for "Rhein"
In river names is fair;
Our "Pocahontas" with "Irene"
As a Princess doth compare;
And the "Antigone"
Is as "Neckar" to me,
If she'll put us "over there!"

—New Song.

 HESE were the sentiments expressed by members of the Tenth Engineers (Forest) in the early days of September, when each one of those days that passed in the camp at American University grounds seemed very late, rather than early. They lengthened out instead of growing shorter as all September days should do, and all because the regiment had not yet departed from a seaport on the Atlantic coast for somewhere in France.

In the latter days of August the regiment had passed in review before the Secretary of War and Assistant Secretary Vrooman of the Department of Agriculture. While the Tenth Regiment is a regularly organized military unit, and a part of the war forces, it remains true that in great measure the work of getting the regiment together had been done by the Forest Service, one of the bureaus of the Agricultural Department, so Mars and Ceres, figuratively speaking, together watched the regiment swing past.

And it did swing past, with the stride of a veteran organization; yet it had been given only a few weeks of drill. The men had real quality to begin with. Bystanders remarked how tall and broad they were, how bronzed and fit they looked. Why should they not appear to be what they were—men used to working outdoors, at jobs that required strength and alertness. Among the lot, also, was a very considerable sprinkling of college men, including not a few recent graduates and undergraduates from the forestry colleges, from California on the West to Yale in the East. "Eddie" Frey of Cornell was one of the intercollegiate champions in the two-mile run when he helped his Alma Mater clean up all four places in the event against the picked men of all the leading universities of the country. Another Cor-

nellian, and one of the smaller men, was George Kephart, coxwain of the Varsity eight-oar champions who had swept the Hudson at Poughkeepsie; and after that he was a member of Cornell's intercollegiate championship wrestling team. These men were typical of those who marched along with others who had achieved championships in "burling," cordwood-cutting, and the like.

After the final review, in which their fitness was everywhere apparent, they began to get impatient. They had men enough, and more than enough, for the unit which was to go across. Their equipment was complete, their personnel ready, chaplain and all.

The equipment included, besides sawmills and logging machinery and implements, a Red Cross ambulance and kitchen trailer, marked with the pine-tree badge of the Forest Service. These additional parts of the equipment were given by the members of the Forest Service, the funds being gathered in small contributions from office and field forces in Washington and on the National Forests, and in the various District headquarters in the West. Women clerks in the office and fire guards in the woods each gave her or his bit to these useful gifts, which were gladly accepted by the War Department and that department provided transportation for them along with the rest of the goods. Funds for an additional ambulance and trailer have been raised by District Six, which includes the administration of the National Forests in the States of Washington and Oregon. These will accompany additional forest engineer units now being recruited to follow the first one.

The welfare of the men is being looked after in other ways, and while no Y. M. C. A. unit accompanied it abroad, the work of such an organization is

being done by the regiment itself through men attached to headquarters. The Chaplain, assisted by Private Knowles Ryerson, who had specialized in rural social organization in California, will help to provide recreation, reading matter, and other comforts and conveniences. He took along a phonograph for each company, and was busily looking before he left for an angel to donate a motion picture projector. Six dozen talking machine records will help to introduce American ragtime to sylvan communities in France, and after they have been played out others will follow over. The Forest Service will help to supply the regiment with reading matter, and with various other necessary luxuries, under a systematic plan; and the American Forestry Association will see that they are supplied with tobacco and other comforts. If some of the fellows wear all the olive-drab knitted sweaters and mufflers that have been promised them they will be so swaddled up that they cannot move to do any work!

The last days at the camp were full of seeming confusion, but every activity was bent toward hastening the final get-away. Some of the last-minute hustle was due to the effort on the part of many of the newer arrivals in camp to make sure that they would be included in the first contingent, in case somebody, for any reason, might be unable to go at the last minute. No one wanted to remain as part of the nucleus of the following battalions. But everyone was cheerful and everyone was busy. Here was a group checking up the service records of the men who were going; there was another squad stencilling labels on boxes that were standing on every hand, while others with black paint and brushes were marking some of the boxes for use on the boat going over and some to go into the holds of the ship.

Major Dubois was omnipresent, gathering up the loose ends, and, as he expressed it, "busy like a bee." Major Chapman, with a most unpractised hand, was endeavoring to sew indelible name labels on his blankets and articles of apparel, while Major Benedict interrupted his own work of making a will to cast aspersions on Chapman's sewing, telling the latter to use white thread instead of black, to take shorter stitches and more of them, and finally to stop sewing said Chapman's name on his, Benedict's, blankets. There is no telling how much seriousness was cloaked under the raillery; possibly there was nothing but a boyish gladness at the prospect of their early departure. Captain Mason, at an Atlantic seaport—to use the phraseology of the "Official Bulletin"—was looking after the procurement and stowage of supplies; Eldredge was busy with equipment; Colonel Woodruff, in his office in the headquarters building, was the guiding center of all, to and from whom a succession of officers came and went on many errands. Every one was busy, clear down to the last private doing a fare-well clothes-washing before he had to learn the methods of French laundering.

And now they have gone, sooner than most persons thought they would get away; sooner than seemed possible when the very barracks were begun only in late July; sooner, indeed, than they themselves had dared to hope.

A second regiment is already forming, with a good start in the later arrivals who came in for the first regiment, which was overmanned from an abundance of volunteers before the time came to go. The next regiment is to have ten battalions of lumbermen and

woods workers, the first two battalions to be raised at once, with the help of the Forest Service; the other eight are to follow in a short time. In addition, nine labor battalions to be used in connection with the forest regiments are to be recruited, two of these to be made ready just as soon as possible.

Both the officers and the rank-and-file have been rapidly gathered for the following contingents, and the activities at the engineers' camp at American University have not been greatly slackened by the departure of the first twelve-hundred. It is hoped that the next unit will be ready in as short a time as that taken by the first regiment, and that they can quickly be put to work for the triumph of democracy in overseas service. More men are wanted, between the ages of 18 and 40, and preferably with skill in woods work. Lumberjacks, portable-mill operators, tie-cutters, logging teamsters, camp cooks, millwrights and charcoal burners are among the types of men desired.

Majors Graves and Greeley, already on the other side before the first contingent started, saw the great possibilities of usefulness for many more men than went at first. The British authorities first called attention to the need of the foresters: now General Pershing's army needs the aid of forest engineers quite as much as do the English and French.

The regiments which follow promise to be equal to the earlier one in everything except possibly in youthfulness and "pep." They already show a probability of being ahead of it in maturity of personnel and seriousness of purpose. A spirit of adventure undoubtedly allured many of those who went over with the Tenth; sober judgment and a deep realization of duty are calling the others. Even at that, it seems that many a forestry college will give of its undergraduates for the forces now gathering, provided they can get in by passing the required tests of physique and experience. Last year the professors were urging their students to stay in school and complete their courses; this year all are more strongly imbued with the idea that every one who can go over should do so, and in the capacity for which he is best fitted. Young men in the forestry schools ought to make good in the forestry regiments, and they will undoubtedly gain invaluable experience. The facts that some forestry students were among the first to go, and that the call for all able-bodied men to get into action is so clear and insistent, are incentives for an increased number of applicants from this type—a type which can be very useful, especially among the lower grades of non-commissioned officers. Preference is being given, however, to men who have had actual woods experience.

The first of the "goodlie companie" of foresters has gone. Others will follow soon. It is a good thing for the profession of forestry, and it is a good thing for the business of lumbering that both classes are working shoulder to shoulder in the forests of France. It was in these same forests of France, some four hundred odd years ago, that two classes—knights and yeomen—fought side by side and learned the beginnings of democracy, and the dependence of one upon the other. American foresters and lumbermen have been learning this interdependence to some extent already; there will be a hastening of the process in the solidarity which is bound to spring up from a common experience on the same ground in a far greater struggle.

WIDESPREAD ACTIVITY IN HOME FOOD THRIFT

By CHARLES LATHROP PACK

President of the American Forestry Association and President of the National Emergency Food Gardens Commission.

An inspection trip of community canneries was recently made by Charles Lathrop Pack, president of the National Emergency Food Garden Commission which is affiliated with the American Forestry Association. In these canneries, where neighboring families work together on a co-operative basis, Mr. Pack sees a splendid example of productive thrift. He makes plain in the following statement that the work of food gardening, of canning and of drying from Maine to California and from the Great Lakes to the Gulf has justified all expectations.



LET us consider what our home gardening signifies. It means that 1,100,000 acres of city and town land are under cultivation this year—much of it heretofore non-productive. The country-wide survey made by the National Emergency Food Garden Commission located nearly 3,000,000 food gardens, but this is not the best of the story. The canning and drying movement has brought back to thousands of American households an art almost forgotten since the days of our grandmothers. This is particularly true of the drying of vegetables and fruits which this year is being done by good housewives on a vast scale.

There is much evidence that our food gardens are helping our people to feed themselves more reasonably and will continue this helpfulness throughout the winter. The editor of the North American Review says in the September number: "Last spring, at garden planting time, we urged the increase of production partly through intensified culture to increase the yield per acre and partly through the increase of acreage by the cultivation of neglected fields and even small plots in suburban and urban areas. How well this policy was executed is seen in the reports of the National Emergency Food Garden Commission that the gardens of the country were this year more than trebled in area. Beyond question this achievement has much to do with the fact that the increase in price of garden products in the year was only 22 per cent, or less than one-fifth of that of bread stuff."

The results will this winter mean much for food F. O. B. the homes of America, and help us, by feeding ourselves, to feed our boys and our allies. We already have a million men under arms in our army and navy. There will be two million by spring. They must all be fed and the soldiers and people of France and England must be fed, and to a large extent fed by us—and we are going to see that this is done. In the canning and drying of vegetables and fruits the homes of America are contributing an important share.

The glass jar manufacturers of this country have delivered, to September first, about 119,000,000 quart glass jars. A survey of the household supply of jars in some twenty typical towns throughout the country shows that the housewives of America this year will use but one new jar to over three and one-quarter old glass jars on hand, and all of them, old and new, have been filled or will be filled. This makes possible the conservative statement that the home women of the country will conserve more than 460,000,000 quart glass jars of vegetables and fruits—certainly three

times what has been accomplished before. The drying has also added several million dollars worth to the food supply by preserving vegetables and fruits.

All of us can contribute our share in fighting the battles of the great war by doing our part in food conservation. This war is as much our war as it is the war of Europe. Unless we can keep the soldiers of the allied armies properly fed and can prevent hunger among the women and children of France, Russia and England, the western line of defense may be thrown back toward the Atlantic seaboard, and it is well within possibilities that in that event we would see the army of the enemy on our own shores.

Much has been said about food thrift and food economy, but I want to come to the defense of the good women of this country because it is the women who really understand what thrift means. It is my experience that the patriotic women of America have been practicing thrift all along and that they know how to practice economy without parsimony. This year they have added to their duties the patriotic work of food production and food conservation. A thrifty woman is a blessing to mankind and the women know very much more about real thrift than the men.

We are going to win this war, and we are going to win it by fighting with food. You cannot starve Germany. Ambassador Gerard has told us so. But we will starve our allies if we are so short sighted and small and mean and unpatriotic as not to deserve the name of Americans. This must not be and I feel safe in saying that it will not be. We face a race of people under a government intent upon the mastery of the world. The war seems far away to most of us but we are in reality fighting for our national existence and our national fate. We will realize this more fully when the great stream of wounded and maimed of our soldiers are sent back to us from France. But none the less, we are going to win this war. Our soldiers are going to do their part. We are sending our sons to the front and we who are at home, men and women, can carry on the good fight and do our part quite as well as the man with the gun. I feel sure that the men and women of America are doing their duty. I feel sure of victory, and when that victory comes there may be erected a monument commemorating the greatest event in modern history, bearing these words: "FOR DEMOCRACY AND CIVILIZATION—A WAR WON BY FREE MEN AND FREE WOMEN FOR HUMANITY."

FOREST FIRES BURN MUCH TIMBER

ABSENCE of rain in some of the western states during the current season has created an unusual menace in the matter of forest fires. Until recently the danger has been kept down by the increased efficiency of the fire-fighting forces of the United States Forest Service and other agencies concerned with protecting the forests. Their work has been so effective that during the earlier part of the season the losses were slight and confined to small areas. Late in August, however, the outbreak of fires became so general as to cause serious alarm.

Reports received by the Forest Service indicated that the situation had then become more dangerous than at any time this year. Millions of feet of timber were threatened and it became necessary for the service to suspend some of its other activities in order to concentrate all available man-power and resources in fighting the flames. In Montana and northern Idaho two thousand men had to be engaged in the work under the direction of forest rangers. The expenditures in these two states during the earlier part of the season had aggregated about \$170,000. With the increased danger the expenditure rose to \$15,000 a day. The entire organization of the Forest Service in the affected districts has been devoting itself exclusively to fire fighting. Men from regions in which there are no fires have been relieving the rangers who have become worn out by their long exertions.

A grave phase of the fire menace is the threatened destruction of valuable timber intended for furnishing airplane stock for the fighting forces of the United States and its European allies. In Oregon and Washington this danger has been particularly emphasized. Several large mills supplying the government with material of this nature are in danger of having to make complete suspension of operations. The gravity of this situation is recognized by the Forest Service and every effort is being made to reduce the hazard to a minimum.

Prolonged dry weather has been responsible for the fire damage. The forests have become so dry that any fire which makes a start is likely to become a serious conflagration. High winds have prevailed also, and this has made control of even the smaller blazes extremely difficult. The seriousness of the situation is shown by the action of the governor of Oregon in postponing the opening of the hunting season in that state. This was made necessary by the need for keeping people out of the woods as far as might be possible.

Among the causes lightning has played an important part. Severe thunder storms have been prevalent throughout the mountain districts and these have resulted in many serious blazes. As a factor in causing forest fires lightning is one of the most difficult things with which the forest protectors have to contend. In a single limited area a short time ago 19 fires were started in one night as a result of lightning strokes.

These fires usually start at the foot of trees which have been struck and they smoulder for some time before making headway. Frequently they cannot be detected until a wind fans them into a blaze and it is no uncommon occurrence for a number of such fires to betray themselves simultaneously to observers through the columns of smoke that arise some time after the storm. One of the most serious phases of fires started by lightning is that they are apt to be in places that are inaccessible to the fire fighters. Trees at great elevations are more exposed to the bolts than those lower down and this increases the hazard.

The efficiency of the fire-fighting forces in the west is declared to be better this year than ever before. This is largely due to the lessons taught by the experience of the last year. The loss in the National Forests until late in August was comparatively small as a direct result of this increased efficiency.

At the offices of the Forest Service in Washington it is said that some of the fires of the summer and fall are reported to have been due to incendiarism, but that carelessness has shared with lightning the chief responsibility. Fires started by campers, settlers and locomotives have been frequent. Little or no rain has fallen for weeks, and, while it may be possible to keep the fires in check by organized protective work, officials say that the danger will not be eliminated until the fall rains set in, and nature asserts her protecting influence.

WAR TIME USES FOR WOOD

THE manufacture of gunpowder requires large quantities of charcoal, which can be secured only from hardwoods, and even smokeless powder requires the use of wood alcohol in its manufacture. This product is particularly necessary in the making of gun cotton. Wood alcohol is also used as a solvent in medicine and the wood distillation industry will contribute largely to the extra amount of hospital supplies needed during the present war. Acetic acid or wood vinegar, which is another important product, is used in the manufacture of cordite and liddite, two high explosives. Necessary increases in the production of steel for war-time uses will require a large amount of charcoal for use in blast furnaces. Besides these direct uses, the development of the American dye industry takes over a great deal of the wood alcohol obtained from the distillation of hardwood.

TWO pieces of maple received from the National Hardwood Lumber Association, one of which was badly discolored, were tested at the Forest Products Laboratory at Madison, Wisconsin. In mechanical tests, where slowly applied loads were used, the two samples were about equal in strength, but in resistance to shock the discolored piece was decidedly inferior. A microscopic examination showed the cell walls of the inferior piece to be partially destroyed by fungi.

WAR AND THE FOOD PROBLEM

BY NORMAN C. McLOUD

If the individual members of the American Forestry Association could see the results achieved by the Association's Conservation Department in its efforts to help solve the national food problem they would realize that the work has not been in vain. In affiliation with the National Emergency Food Garden Commission this department has played an important part in the creation and conservation of a vast food supply. Through home gardening, home canning, home drying and home storage America has achieved a wealth of food products for both summer and winter. The growing season of 1917 has produced results hitherto unapproached in the annals of American gardening. In reckoning the worth of this garden crop general opinion accords generous credit to the efforts of the Commission and the Association's participation therein. The conservation of this yield is now under way, with results as important as those already achieved in the line of production. Every member of the Association is in position to help the cause by doing what he may to stimulate interest in canning, drying and storage for winter uses. Co-operation in this respect will be cordially appreciated by the officers and will constitute a patriotic service.

THE more closely one looks at the food situation these days the less certain he becomes as to the real center of interest. National attention is being given so many phases of the question that it is hard to tell which seems most important. Food production, food prices and food conservation are all occupying the center of the stage. The effect is that of a three-ring circus, and in the face of this circumstance the individual citizen has responsibility to all three. That he is fully conscious of this responsibility is shown by the success of the home garden movement, the popular enthusiasm on the subject of price regulation and the persistence with which the people of America are engaged in the home canning, home drying and home storage of vegetables and fruits for winter uses.

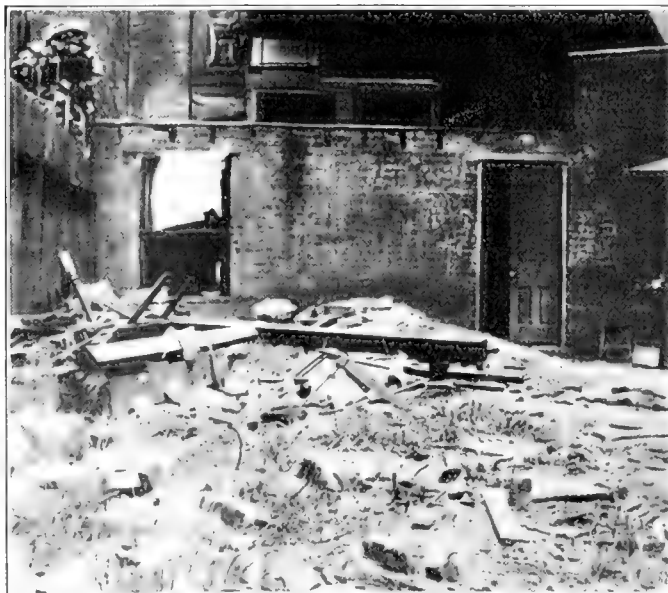
All America has been amazed at the success of the home garden movement. The new planting area created through the efforts of the National Emergency Food Garden Commission and the Conservation Department of the American Forestry Association embraces back yards and vacant land in and around every city, town and village in the United States. With more than three million of these gardens flourishing where none had grown before there has come an addition of three hundred and fifty million dollars in crop value. This tremendous contribution to the resources of the nation is of vast importance in its relation to food prices and food conservation. Its effect on prices is immediate. New competition to the extent of three hundred and fifty million dollars has been no mean

factor in the cost of living during the summer of 1917. The thoughtful student of economics cannot fail to realize that without this competition the cost of living would have been greatly increased. Household expenses have been bad enough as it is. Without the food gardens they would have been far worse.

Herein lies the importance of food conservation in its relation to the generous crop of the home gardens of the nation. It is not alone for the growing season that the increased planting area must be made to exert its beneficent influence. Nature's contribution has as much meaning for the winter months as for those of summer. Wise utilization of the heavy crop demands conservation for the future. Conservation for the future demands home canning, home drying and home storage. These things must be done on a national scale. This means that they must be done in every household, or, in larger terms, by every community of households working together as a unit. In no other way may America

reap the full benefit of her heavy home garden crop. In no other way may the individual do such effective work in the regulation of food prices. In no other way may he accomplish such effective food conservation.

In its efforts to bring about the most effective thrift in handling the garden crops the National Emergency Food Garden Commission is conducting a nation wide campaign of education. This campaign is fashioned along lines to stimulate canning, drying, storing and other forms of preparing foodstuffs for



THE OLD BACK YARD.

A scene which was all too typical before home gardening was stimulated by the National Commission. Note the crop carefully and then look at the picture of the new back yard on another page.

the winter season. The Commission's Home Canning Manual was its first contribution to the literature of practical conservation. This was a companion book to the Home Gardening Primer, which was circulated to the extent of a million or more copies during the spring planting season. In the canning manual explicit directions are given for preparing vegetables and fruits by the single period, cold pack method of canning in tins and glass. As an indication of the care taken in its compilation it may be men-

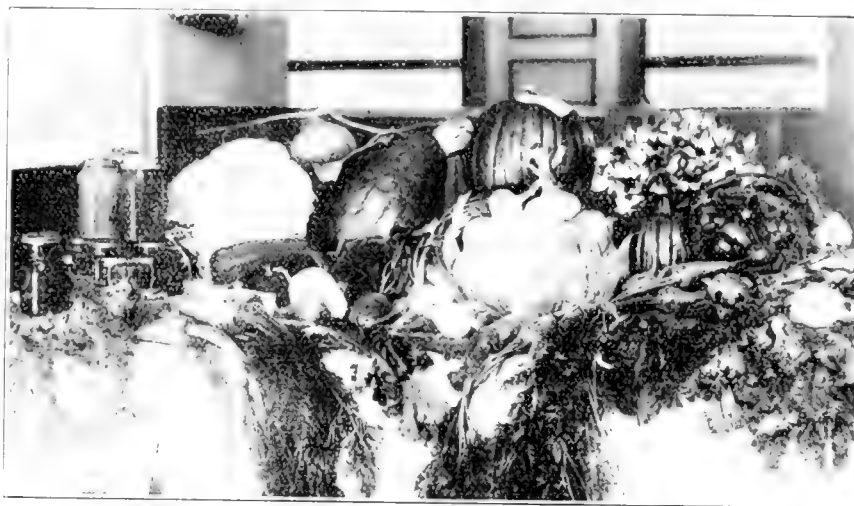
tioned that the original manuscript was prepared by the Commission's experts on a basis of their own experience and on information obtained from the United States Department of Agriculture and various other agencies. When the manuscript was in completed form copies of it were sent to a large number of the most competent authorities on the subject throughout the United States. In each case explicit criticism and constructive suggestion were requested, and in every instance the request was met with prompt compliance. In this way the manual was made to embody the best information from the best possible sources, and it was published in full confidence that it carried to the people of America the latest and most complete knowledge of the art of canning as developed by modern science.

That this confidence was well warranted has been shown by the acceptance of the Home Canning Manual as a standard and authoritative addition to the national literature on domestic science. This acceptance has been widespread and cordial. In various branches and bureaus of the United States Government the manual has been given the stamp of official approval by its adoption

for issuance to government institutions. Through the Marine Hospital Service and the Bureau of Education the booklet has been given wide circulation. As a result of suggestion in official bulletins government department employes have procured the manual for use in their own homes. In addition to general recognition from these official sources the manual has been the subject of a large demand from senators and congressmen for distribution to their constituents. Throughout the

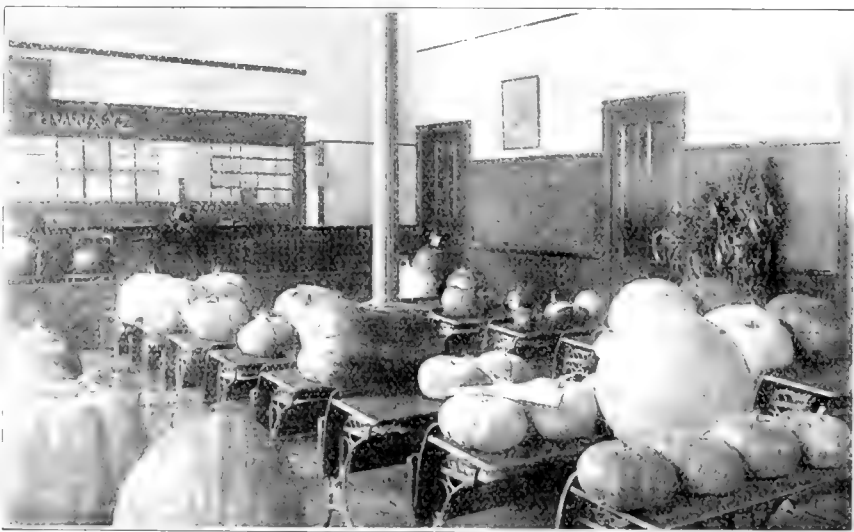
country the recognition has been in keeping with that accorded in official circles at the national capital. Its distribution has been undertaken and its use urged on the public by state and local departments of education, by state and local war committees and by countless clubs and organizations interested in food conservation and domestic preparedness. That this general acceptance was based on merit is not to be questioned. Without such merit the acceptance would not have been possible. With such widespread endorsement the Commission cannot fail to feel that its manual has taken a foremost place in the literature of economics and that its influence for constructive conservation is fully demonstrated. In the preparation of the Home Drying Manual

similar care was exercised. Every precaution was taken to insure authenticity in the instructions for reviving the lost art of vegetable and fruit drying in the homes of America. No available authority was overlooked and the Commission felt that the booklet was a worthy companion to its manual on canning. In this instance also was the confidence given warrant by the reception accorded the work. The official recognition given the canning manual was invariably shared by its



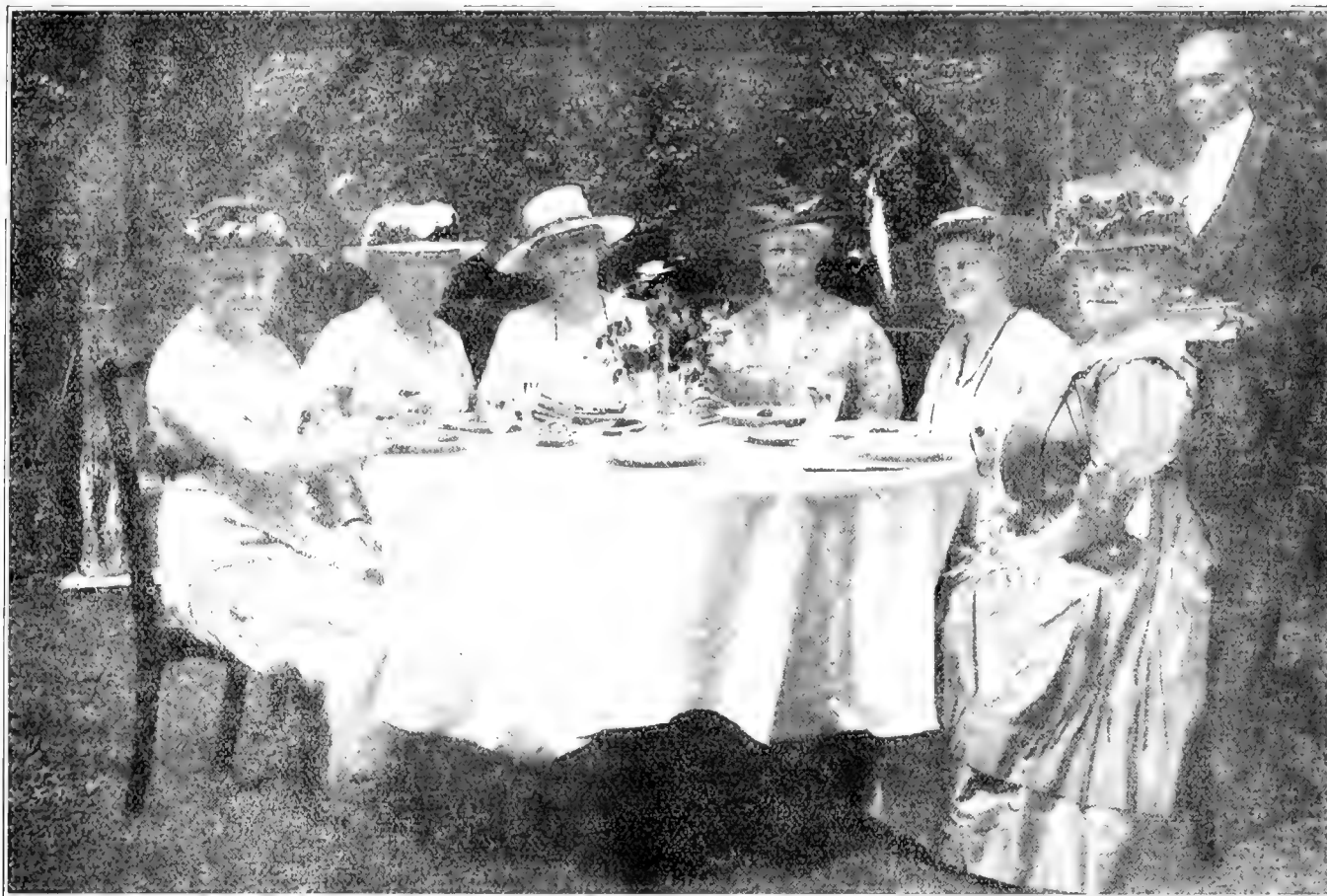
READY FOR EITHER CANNING OR DRYING.

Who wouldn't envy the home gardener who produced this assortment of vegetables? The table is loaded with the products of a war-garden, worthy of the best professional growers. The products are here collected for canner or dryer and give rich promise for the winter.



SHOWING HOW SCHOOL CHILDREN GET AHEAD.

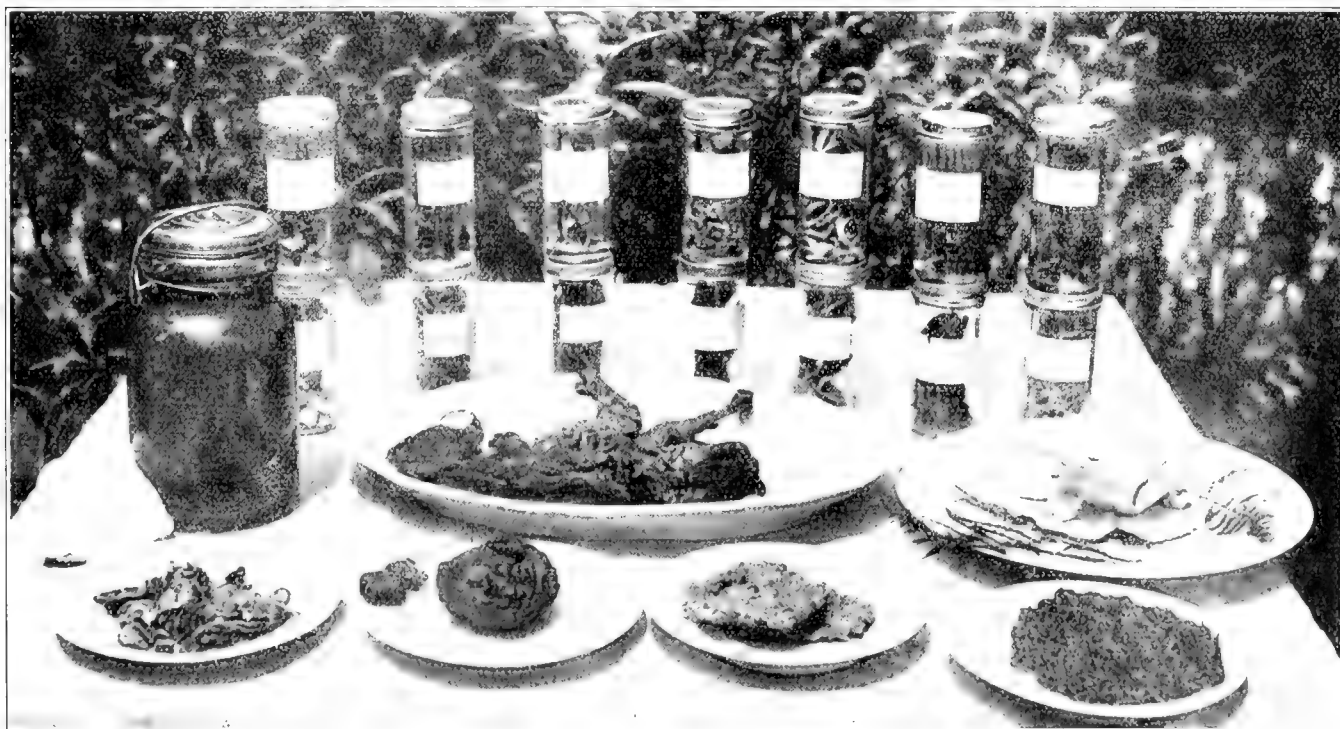
This picture suggests interesting possibilities in the way of pumpkin pies for the coming winter. The pumpkins were raised in war-gardens, planted and cultivated by school children and it is safe to guess that none of the young gardeners will go hungry for pie during the school season.



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DRIED FOOD TAKES ITS PLACE IN SOCIETY.

Recognition of the value of dried vegetables, fruits and meats was given in a luncheon at the National Capital at which the hostess was Mrs. Robert Lansing, wife of the Secretary of State. This picture shows the guests, all of them prominent in the official set of Washington society. They agreed that the luncheon was one of the most delicious they had ever eaten. At the table, from left to right, are: Mrs. Redfield, wife of the Secretary of Commerce; Mrs. Hugh L. Scott, wife of the Chief of Staff of the United States Army; Mrs. Champ Clark, wife of the Speaker of the House of Representatives; Mrs. Lansing, the hostess; Mrs. Alice Pomeroy, wife of the Senator from Ohio and Mrs. Josephus Daniels, wife of the Secretary of the Navy.



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TOOTHISOME VLANDS AT MRS. LANSING'S DRIED FOOD LUNCHEON

When Mrs. Robert Lansing, wife of the Secretary of State, entertained prominent Washington notations at luncheon the entire bill of fare was made up of Dried Foods. This picture gives an idea of the appetizing spread. The six course meal included dried vegetable bouillon, dried chicken, dried vegetables of many kinds, dried fruit and dried mint. The Neapolitan salad was typical of the luncheon. It was made of dried peas, dried lima beans and dried tomatoes, with cream cheese filling. All the vegetables were "brought back" before using, by steaming and soaking. The roast chicken, shown in the center of the picture, had been first cooked, then dried in the oven and then steamed and soaked, to restore its original volume. With the chicken were served caramel sweet potatoes, corn balls and creamed dried cucumbers on toast.



SUCH A POTATO PATCH!

With war gardens of this nature thriving throughout the land America faces the winter with cheerful confidence. The boys did all the work and deserve all the credit.

sister booklet. Wherever the government or other agencies undertook the distribution of the one it did the same thing with the other. As a result of these various forces and of the distribution of 30,000 or 40,000 a day from the offices of the Commission each of the manuals has attained a circulation of several million copies. The aim of the Commission to place the booklets in practically every home in the land has approached realization and those who are familiar with the enterprise are of one voice in expressing appreciation of this patriotic gift to America at war.

As an indication of the national importance attached to the preparation of foodstuffs for winter uses widespread interest was taken in a luncheon recently given in Washington by Mrs. Robert Lansing, wife of the secretary of state. At this luncheon the entire bill of fare was made up of dried food products. Women prominent in the social life of official circles at the national capital were included in the list of guests and all of them manifested genuine enthusiasm over the excellence of the luncheon.

Not content to rest on its laurels with a realization of work well done the Commission late in August made contribution of another booklet in its series of publications on food conservation. In the fourth manual explicit instructions are given on a variety of subjects involved in preparedness for the winter season. The topics include storage, pickling, fermentation and salting and to these are added directions for making potato starch, fruit butters and kindred products. Prepared with the same care given the other manuals the new booklet met with immediate welcome, and the demand for it has been such as to place a severe strain on already overtaxed printing facilities. With a determination to meet the demand promptly the Commission has had some of the largest printing establishments in Washington, Baltimore and Philadelphia running day and night. As a result there

has been no delay in meeting requests for the various publications and this promptness has played its part in giving the manuals the widespread distribution with which they have met.

The storage of vegetables for future uses is as important as canning and drying. To keep vegetables in their natural state is regarded as the simplest form of preparation for winter needs and therefore one of the most useful. As a premise the manual declares that by taking proper precautions against decay and freezing an abundant supply of many kinds of fresh vegetables may be kept for winter uses at a minimum expenditure of money and effort. From the introduction to the manual I quote some of the arguments in favor of home storage as follows:

"The importance of making provision for winter food needs was never so great as this year. Every pound of foodstuffs than can be spared for export will be needed in Europe for feeding American troops and to prevent the starvation of the domestic and military population of the Allied Nations. Every pound of vegetables stored away for home uses will release food for export. A nation at war is a nation with a food problem. A nation with a food shortage is a nation in peril. For this reason it is of vital importance that no vegetables of high food value be allowed to go to waste.

"The home gardening campaign conducted by the National Emergency Food Garden Commission this year resulted in the creation of a vast new planting area. More than three million gardens have been planted where none grew before. The output of these gardens is greatly in excess of immediate needs. Unless proper steps are taken to safeguard the surplus the waste will be prodigious. This Commission has already stimulated nationwide activity in canning and drying. The purpose of this booklet is to arouse similar interest in the storage of



THE NEW BACK YARD.

Instead of trash and tin cans the backyards and vacant lots of America now show crops of this nature. Note the contrast with the earlier picture of the old back yard—and take your choice.



DOESN'T SHE LOOK LIKE A PRIZE WINNER?

This young woman has put up 56 varieties of vegetables and other food products. She is typical of those who are eligible to the winning of prizes in the Commission's national contest for the best canned goods displayed at a fair. She is an earnest believer in the cold-pack process, for she knows what it can do.

vegetables and in other forms of winter preparedness.

"Storage is an essential factor in Food Conservation. Households which fail to store their own supplies will find themselves forced to pay winter tribute to the wide-awake business concerns which have practiced storage on a commercial scale. By storing vegetables during the season of lowest prices even the household which has no home garden can save much of the cost that would be involved in winter purchases and incidentally make important contribution to the national food supply."

In its list of vegetables which may be placed in home storage to good advantage the Commission includes late potatoes, beets, carrots, parsnips, turnips, sweet potatoes, onions, celery, cabbage, salsify, dry beans, dry lima beans, cauliflower, brussels sprouts, squashes, parsley and even tomatoes. Various methods are explained for keeping these vegetables, ranging from the pantry shelf, the attic and the cellar to outdoor pits, cellars and cold-frames. One form or

another of storage is available to every household. Even the apartment dweller can find the room and meet the requirements for storing some of the products mentioned. The results will well repay the slight effort involved.

Potato starch is given special attention in the manual. As an article of diet this home-made product has qualities that commend it to the consideration of every house-

hold. As a measure of conservation it utilizes culls, bruised, poorly developed and otherwise useless potatoes, of which it is estimated that probably 75,000,000 bushels go to waste in the United States each year. Another advantage is that it provides a healthful and appetizing food product which can be used in many ways where flour is now used. Added to these are the ease and simplicity with which it may be prepared. No equipment is needed other than a cylindrical grater or sausage grinder, a pan or galvanizing vessel for holding the potatoes, another vessel into which the grating



FAIR CANNERS AT A STATE FAIR.

An exhibit of canned goods prepared by a club of girls and displayed as an object lesson for their neighbors. This is food thrift in its most practical form and is the sort of thing that will enable Uncle Sam to feed the world.



A MAYOR AND A WAR GARDEN CHAIRMAN WHO ARE JUSTLY PROUD.

This picture shows Mayor Davis of Cleveland and George A. Schneider, chairman of the Mayor's War Garden Committee, inspecting the crops in a garden planted and cultivated by a troop of Boy Scouts. This garden is in the heart of the city and fronts on Euclid Avenue, a street as famous as the Champs Elysee or Piccadilly. This garden is one of the many which are to be found on the Lawns of Euclid Avenue. It is surrounded by homes of wealth and fashion, and this environment doubtless had its influence in prompting the young gardeners to make their garden as attractive as possible. Mayor Davis is the man with his hands behind his back. Mr. Schneider stands next to him, towards the center of the picture. Scout master Mc Masters is shown with his hat off, near the sign.



WAR GARDEN ON THE LAWN OF ONE OF CLEVELAND'S HANDSOME HOMES.

In Ohio the home garden found ready response. Cleveland is noted for its beautiful homes and broad sweeps of lawn. In this picture is shown the home of Mr. and Mrs. Edmund Stevenson, Burke, in the Wade Park district, one of the most exclusive residential portions of the city. Mr. Burke is a man of great wealth to whom home gardening appealed as a patriotic movement. Converting his well kept lawn into a garden patch he raised the crop here pictured, consisting of corn, cabbage, carrots, beets, tomatoes, beans, parsnips, pepper and parsley. Mr. and Mrs. Burke are spending no time waiting to see what the neighbors will send in for their evening meal.



WHAT ONE CLEVELAND FACTORY ACHIEVED IN ITS WAR GARDEN.

This is not a Kansas Ranch, as might be suspected from the broad acreage devoted to the raising of farm produce. It is the war garden of the Otis Steel Company's employes, on vacant land near the company's big manufacturing plant, in Cleveland. This is one of the gardens in which Mayor Davis and Chairman Schneider take much pride. It is typical of the factory gardens in one of America's greatest industrial centers. Such gardens have been made throughout the manufacturing district of Cleveland and other cities and their contribution to the nation's food supply is of tremendous volume. This garden includes thrifty crops of such vegetables as cabbage, corn, beans, potatoes, tomatoes, cauliflower, egg plant, celery, beets, cucumbers and kohlrabi.



ANOTHER WAR GARDEN WHICH HAS THRIVED ON A CLEVELAND LAWN.

Louis F. Krieg is also a Cleveland home gardener who does not have to sit around waiting for contributions from the neighbors. From the looks of the garden here pictured the Krieg family has enough for the entire neighborhood. As a result of converting his vacant lawn into a new planting area Mr. Krieg has a crop which ranges through the alphabet from beets to turnips, and embraces cauliflower, onions, tomatoes, carrots, cabbage, Swiss chard, corn and cucumbers. According to a report received from George A. Schneider, chairman of the Mayor's War Garden Committee, this garden is one of the thousands which have made Cleveland one of the most important centers of city farming during the war emergency.

or grinding is done and another into which to empty the gratings; water in abundance and cloths for wiping. The starch resembles wheat flour in whiteness and smoothness. Its use in making such dishes as boiled custard, lemon pudding, fruit blanc-mange, lady fingers, angel cake, lemon pie and

sponge cake is described in detail in the manual. For these and some other purposes many expert cooks declare the starch to be superior to wheat flour.

Fermentation and salting are also given detailed attention in the new manual. Complete instructions are given for the making of sauerkraut by both methods and directions are also included for the preservation of cucumbers, green tomatoes, beets, string beans and peas by fermentation. During the winter these vegetables may be served as they are or they may be freshened by soaking in clear water and cooked as fresh vegetables. Because of this feature they make an important addition to the winter diet and furnish useful variety for the daily bill of fare.

The manual also gives instructions for making peanut

butter, apple butter, gingered pears, grape jam and various vegetable and fruit pastes for use as desserts or as garnishes. The variety of subjects included make an important addition to the household collection of books on food conservation. As with the booklets on canning and drying it is intended for



CANNER INSTEAD OF CANNON.

The group here pictured forms an important part of the National Army. It is made up of members of a canning club in a Middle Western community. These food savers are playing a big part in the war-time emergency.

free distribution. To procure a copy of any of these booklets an application enclosing two cents for postage should be sent to the Commission at 210-220 Maryland Building, Washington, D. C.

In addition to its publication and its daily canning, drying and storing lessons published in 2000 newspapers throughout the country, the Commission has made another contribution of national importance to the campaign for food conservation. This contribution takes the form of \$5000 in prizes and National Certificates of Merit to be given home canners in every state of the Union and in various parts of each state. One thousand prizes of \$5 each will be awarded for home canned vegetables displayed at fairs, food shows or other public exhibits held anywhere in the United States. With each



FROM GARDEN TO PANTRY SHELF.

Some of the steps in cold-pack canning are here illustrated. The vegetables make the journey from left to right, passing through the various processes from picking-over and washing to sterilizing in a wash boiler hot-water bath, placing in jars and sealing. The girls are all eagerness and enthusiasm as may be seen from their expressive faces. Suppose you try this on your own household.



HAVE SOME CARROTS?

Who could refuse such fresh and palatable looking vegetables as are here shown? These carrots were raised in a home garden and canned by the cold pack process.

prize will be awarded a certificate to serve as a permanent record for the holder. The only stipulations are that the canned goods entered in the contests shall be home canned and the product of a home garden in a city, town or village. Keen interest has been shown in the prizes and so general has been the response from fair officials as to indicate that the competition will be one of the most popular ever conducted on a national scale.

While popular interest is now concentrated on canning, drying and storage, the echoes of food gardening pour into the Washington offices of the commission in never ending stream. Typical photographs taken from the day's mail are those from Cleveland, Ohio, reproduced in this issue of *American Forestry*. In Cleveland the home gardening movement made a remarkable showing. Through the activities of a war garden committee appointed by Mayor Harry L. Davis, and with the cooperation of the National Emergency Food Garden Commission, the Ohio metropolis blossomed with food gardens from center to circumference. Chairman George A. Schneider was the active head of the mayor's committee and he carried on his work with an enthusiasm and effectiveness that have won recognition for him as one of the most successful of the year's leaders in enterprises of this nature.

In the work of individual gardeners an example of

what may be accomplished in small space is given by the results of the home garden of Mr. and Mrs. R. L. Betty at West Point, Mississippi. On a piece of land less than 70 feet square the Betty family has produced and is still producing all the vegetables used on the table of a family of three for seven months, giving a supply that will continue until Christmas. In addition to this yield the garden provided the material for 640 cans of fruits and vegetables, prepared by Mrs. Betty on a small home canner. As an added measure of crop value may be mentioned the realization of \$30.00 in cash from the sale of products not suitable for canning. Other results are one peck of dried corn, one peck of dried butter beans, one peck of California white peas, sufficient good seeds for next spring's planting, a good crop of potatoes and sweet potatoes, 10 pumpkins, 150 collards for winter and a 70 foot row of peanuts. The total expense for the garden was less than \$5.00 and the expense for cans, canner and fuel less than \$30.00.

This garden may be taken as typical of the results achieved by home gardeners throughout the land. Their contribution to the resources of the nation is tremendous. Their yield in individual comfort and satisfaction to their owners is of similar worth. Of no less value is the object lesson in thrift which these gardens have furnished. In the case of the Betty garden this thrift prevailed from seed time to harvest. Even the grass and weeds on the planting site were not wasted. All vegetable matter of this nature removed from the garden plot was saved to use in enriching the soil. This utilization extended throughout the season with the maturity of



COMMUNITY CANNING WORK.

The Commission recommends cooperative canning and drying. If several families join forces and buy equipment the cost is slight to each household. By working together at some central place the work is easier for all.

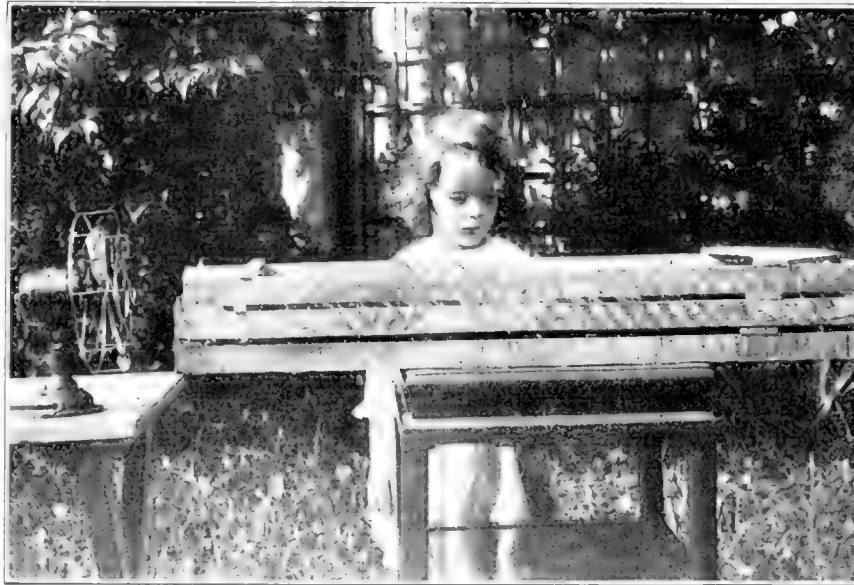
the various crops. Tomato vines, for instance, were employed to enliven the soil for the asparagus bed. Corn stalks were placed in a ditch under the late potatoes to hold the moisture. Waste tomatoes from canning operations were thrown on a fertile spot, where the seeds germinated and produced plants which were sold to eager buyers for late planting. As a lesson in thrift such gardens as this furnish inspiration to all home gardeners. They are a manifestation of the true patriotism. Their owners are the true conservationists. Their carefully guarded food supply is the true secret of national preparedness. Without them America would face the chill of winter with dread and apprehension. Without them we would have difficulty in feeding even ourselves, to

say nothing of supplying food for our troops in foreign fields and the people of our European allies. With the rich harvest of these gardens and the careful conservation of their output we can go into the coming winter with the calm assurance and quiet confidence which are essential to a nation at war. We can know that America is in position to do its duty toward civilization—a duty which involves food supply as much as it involves men and munitions.

Among the nations engaged in the fight for freedom America is the one country with a surplus of foodstuffs. All Europe is in a state of chaos. Her fruitful farms are devastated and her producing peasants have become embattled warriors. Lacking the land for cultivation and the men for doing the work she must look to the United States for the means of sustaining life. Without our help she must face famine, and famine means defeat. Her soldiers cannot fight unless they are fed. Under the pinch of hunger her domestic population cannot give her armies adequate support. America's duty, therefore, is manifest. We must share our abundant stores with the

people of Europe. That this may be possible we must practice food thrift without cessation. Nothing must be wasted. Nothing must be unwisely used. The surplus of summer must be made the abundance of winter. By canning, drying and storing for our own uses we will release foodstuffs for European export. Nothing less should be considered. If the world war is to result in victory for democratic arms and democratic institutions nothing less is possible. Every American citizen must become a soldier in the army of food conservation. Food waste is the foe and food extravagance the enemy plotter. Food economy must be the watchword and food thrift the battle cry. To keep these things in mind and act accordingly will mean victory. To ignore them will

mean that the fight is hopeless. Faith in the people of America leads to the conclusion that the American food



WHAT COULD BE SIMPLER THAN THIS?

Here you see one of the easiest forms of vegetable and fruit drying. The three trays are made of strips of wood with galvanized wire mesh. They are placed on a table and facing the end of the trays is an electric fan. Excellent results are obtained in this way.



DO YOUR APPLES LOOK LIKE THIS?

A dish of dried apples, neatly and efficiently curled by modern methods of drying. Think of the apple pies made possible by having a store of such apples on your pantry shelf.

supply will be so wisely utilized as to bring about complete triumph for the allied forces of democracy.

PROFESSOR R. R. FENSKA who has been professor of engineering at Wyman's School of the Woods at Munising, Michigan, has resigned to accept a position as assistant professor of forestry at the University of Montana, Missoula, Montana.

A DEPARTMENT of Forest Chemistry has been established at The New York State College of Forestry with Dr. S. F. Acree, formerly of the United States Forest Service Laboratory at Madison, Wisconsin, in charge.

WHAT ABOUT TREE SURGERY?

BY J. HORACE McFARLAND

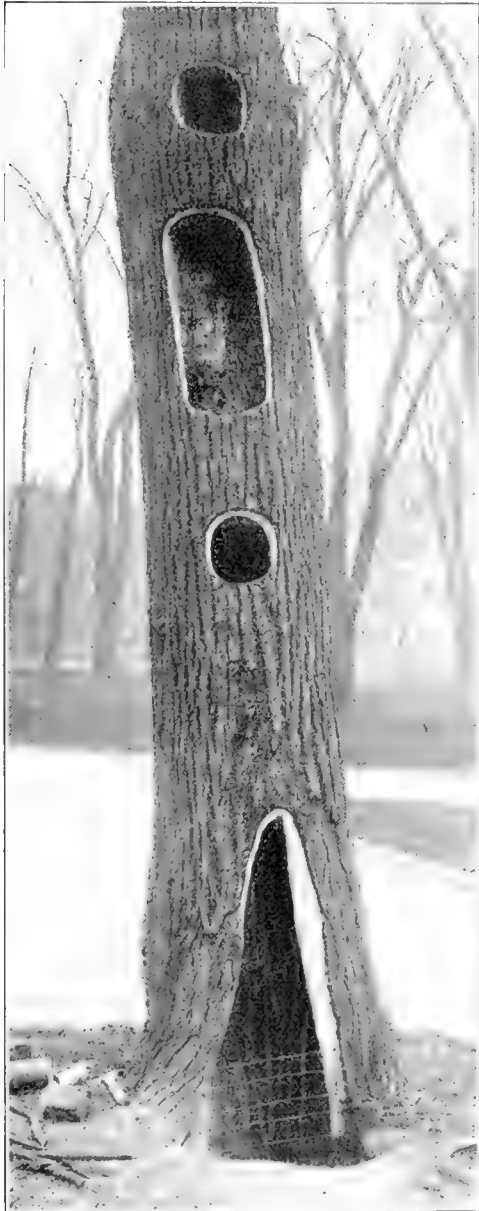
TREES are marvels of natural engineering. When I see a tall tulip or a great elm sustaining a gale of wind; when the small boy comes into view hitching himself out to the perilous end of a cherry branch; when a saucy robin scolds me from the very tip of a twig on which he has just alighted, I think again of the wonder of the woody structure that can carry so much of an overload, do and be so many things in flower, fruit and timber production, and yet be a most beautiful object in its adornment of the surrounding landscape.

I have several times tried out the breaking strain of little tree twigs, brought to the ground by progressive ice-storms. From twelve to sixteen times its own weight of ice encased the twig before it broke away, and then the break occurred by reason of wind pressure, not of overweight. Few engineers provide such a factor of safety as is found when a certain twelve-foot cedar at my garden gate bows its tips in a graceful semi-circle until the topmost twig touches the snow under the influence of the weight of slush with which it is laden.

When I see a scene of this nature and realize that the tree is going to straighten up and become upright again after its winter trials are over, again the wonder assails me; wonder whether any human engineer would even think of designing a structure to stand such a strain! And, if he did venture, how would the engineer's tree look, in comparison with God's cedar.

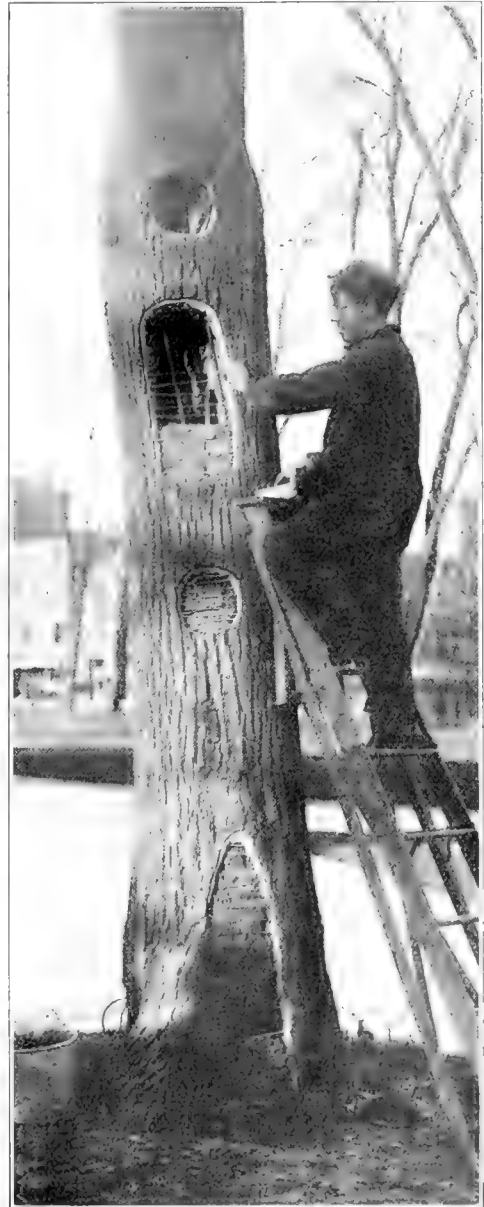
Even disease is sustained by trees with resistance and fortitude not possible to man-made construction. When, after what must have been at least two generations of progressive decay, the great oak succumbs and is broken, it is seen that for many years the tree has existed, made leaves and acorns, and has done its beneficent work on a mere shell and remainder of its once sturdy trunk. The man-made column of Bessemer steel, once it has begun to rust, simply disappears in a few years.

Once a certain horse-chestnut at my home showed a "split" at the fork of its two main branches. When investigated, the split developed into a mass of rotten wood.



READY FOR THE FILLING

Tree on the State Capitol grounds at Albany, N. Y., with decayed portions removed and ready to be filled by an expert tree surgeon working for the New York State Conservation Commission.



THE WORK PARTLY COMPLETED

The filling of the lower cavities of the tree with concrete has been completed and the method by which the operator is filling the upper cavities is indicated by the photograph.



Courtesy the Missouri Botanical Garden

TREE IN NEED OF REPAIR

in which was growing a young horse-chestnut tree with a bundle of roots fully two feet long and six inches through. In the crotch, opened by wind and snow, a mature root had lodged and finding germinating conditions, had begun literally to eat the heart of its own father-and-mother tree.

When fully explored, and the decayed wood removed, the cavity in this tree was found to embrace all of its main bole but a bare inch inside the bark and cambium, and to extend more than ten feet

up the main branch. The tree was nothing but a shell, and the first gang of "tree surgeons" which had opened its wounds and diagnosed its injuries was aghast at the situation, being afraid to undertake final treatment. As the horse-chestnut occupied a strategic position on my lawn, and I was not of an age to calmly contemplate waiting twenty years or more for the gradual replacement of its effective beauty, I was willing to call in a consultant.

His conclusion was that the tree might be saved; and he prescribed an interior arrangement equivalent to the artificial leg my father tried to wear after his heroic experience at Gettysburg in 1863. Two lengths of flat iron, $2\frac{1}{2}$ inches by $\frac{5}{8}$ inch, each eleven feet long, were inserted and cross-braced. The clean cavity was made aseptic; a curious drainage lip was carefully cut around its edges, and then the whole of it was concrete-filled.

No, not the whole of it; for the concreting stopped short or inside of the bark surface at the drainage

lip, or "water-shed," as I was informed it was called in the terminology of the trade. There must be no obstacle in the way of the rolling over of the cambium layer, if the operation was successful and the patient also lived.

All this trouble had arisen because of the original split in the crotch of the tree. To avoid a recurrence of this split when the winds should again blow, the surgeon braced the big limbs above, not by rigid, unyielding iron, but by easy chain links, connecting the parts of the tree, but permitting wind movement. These chains were anchored by bolts run clear through the solid wood above the cavity, the heads being recessed into the central structure inside the cambium layer.

To provide an outlet for any moisture that might leak through, a drainage tube was inserted at the lowest level of the excavation.

There were five of these horse-chestnut trees, all

of them important to my home, and all having been growing about it some thirty-five years before I came into possession. All were in trouble from crotch splits, though not to the extent described above. All were treated as seemed necessary, being cleaned out to sound wood, braced above and below, and duly filled with concrete. The work was expensive, as well as extensive; but when I contemplated the bill on the basis of putting the trees into prosperous health, as compared with their im-



Courtesy the Missouri Botanical Garden

BOLTED AND BRACED



Courtesy the Missouri Botanical Garden

FILLED WITH CONCRETE AND PAINTED

pending death by disease or mutilation by wind-storms, it did not seem so large. If I had had the amount of it piled up in copper cents, the bulk of them would not

narrower cavities are almost closed; the trees have grown vigorously and bloomed exuberantly.

But there has been some later treatment by the tree-surgeons. Just as with man-surgeons, they are learning. When I think of the suffering endured by my father in the thirty years he lived after the surgeons had done their Civil War best and worst! —with his two legs, and



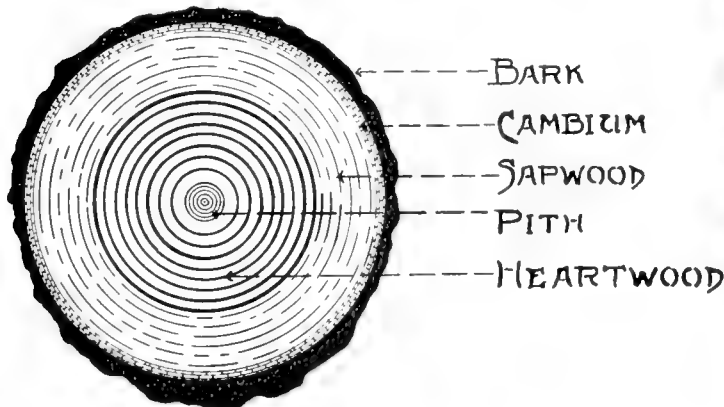
CUTTING OUT A CHESTNUT BLIGHT CANKER

A member of the Pennsylvania State Forestry Department being a tree surgeon, cut out this canker, filled the cavity and the tree was saved.

have gone far toward providing me with the shade and eye-satisfaction furnished by the living trees.

All this was eight years ago. What has happened? Has the tree-surgery been worth while? Did the patients live?

Indeed they have lived! And they have prospered amazingly, as shown by the way in which the cambium layer has "rolled" over the openings in the limbs and trunks. Some bolt-heads are covered in; several of the



CROSS SECTION OF TREE TRUNK



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TREE SURGEONS OPERATE ON PHILADELPHIA'S VETERAN ELM

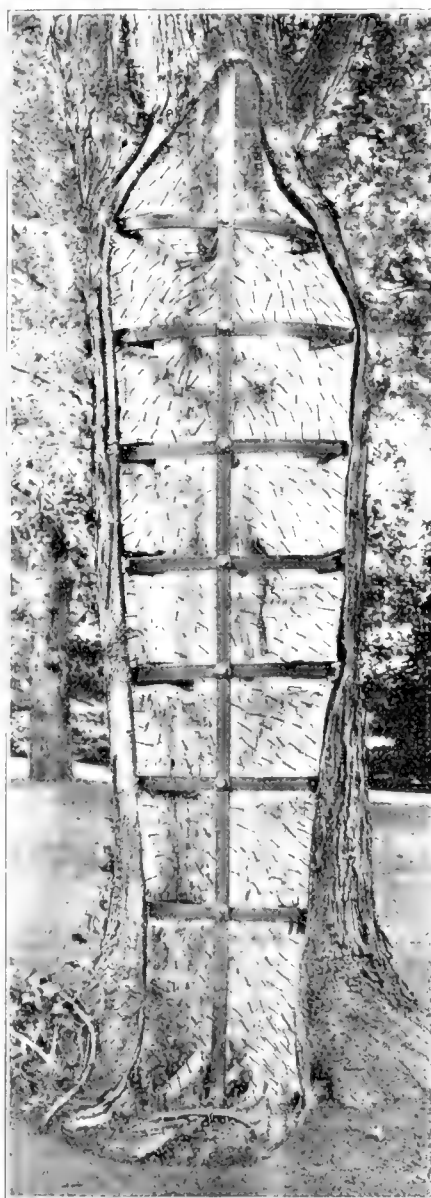
The giant old elm, that has stood for nearly two centuries at the Dauphin Street entrance to Fairmount Park, Philadelphia, has undergone a wonderful and what promises to be a most successful operation at the hands of the Park Commission's tree experts, diseased portions of the trunk having been completely cut away and the huge cavity filled in with cement and the limbs braced with bolts and bars.

compare the conditions with the surgery of today, I have patience with and admiration for the advances in tree surgery within the past decade.

The solid concrete filling has proved to be too resistant to wind pressure, and it has been replaced by sectional filling, which yields enough to prevent strain on the remaining tree structure. The sides of the long cavities are now held together by ingeniously simple threaded bolts. The former coverings of zinc or tin have been discarded. More care is taken to make cavities aseptic.

There are other refinements and some foolishnesses—at least some of the refinements look expensively foolish to me.

It is, after all, a question of good judgment, of tree values. That real tree-surgery is both successful and desirable, I am sure. That it is practiced by some who are ignorant and some who are venal—and by some who are neither, but are injudicious—is probably true. That its common-sense application, by men who have actual knowledge, will prolong the life of many fine old trees,



Photographs by courtesy of the Dacey Tree Expert Company

TYPICAL EXAMPLE OF "TREE PATCHING" ALONG IMPROPER LINES

If men were subject to such monstrous incompetence as that which has been applied to so many thousands of our fine old trees by untrained and irresponsible pretenders, men would suffer blood poisoning, lockjaw and death. But fortunately trees are sturdier than men and they come to their death more slowly, but none the less surely. This case of tree patching, like most of its kind, has violated all the principles of tree surgery and ignored the laws of tree life. The decay was only partly removed. The disease continued with increased intensity. No means had been provided to exclude the moisture. No mechanical bracing had been provided, in spite of the fact that decay had left the tree very weak.

MECHANICALLY BRACED TREE READY FOR THE FINAL WORK

Real tree surgery does three special things and insures a fourth. First, it removes all decay, all, not nearly all, and prevents further decay by proper disinfection, waterproofing and skillful preparation of the cavity. Second, it excludes all foreign substance, especially water, by the use of a novel and highly important device called the watershed, and also by a skillful method of filling. Third, it restores the physical strength of the tree by the use of wonderful types and combinations of mechanical bracing, most of which is completely erased in the filling on the inside of the tree. All three of these things are of vital importance and value.

OPERATION PROPERLY COMPLETED ON A VETERAN TREE

The fourth thing which real tree surgery insures is the restoration of the health of the tree and its preservation. An injury usually permits the entrance of a fungus disease. Once disease starts by attacking the interior cell structure, it proceeds with increasing severity. The tree responds gloriously to proper treatment and starts almost immediately to heal over the filling. In filling a cavity in a tree, it is highly important to insure it against cracking and breaking to pieces in the swaying and bending of the tree, which is often violent in the heavy winds. This is accomplished by correct mechanical bracing, plus the all-important sectional filling method, which is clearly illustrated in this photograph.

cannot be doubted by any man of practical experience.

In a southern city I found sad evidence of work of the tree-charlatan. Certain splendid trees of *Magnolia grandiflora* had been "repaired" by the fakers permitted to represent a landscape-gardening firm carrying an honored name. These clumps had climbed the magnolia with pole-lineman's spurs, in order to brutally maltreat the head of the tree. The result was dreadful!

Other frauds, knowing nothing of tree life, and being essentially "butchers" rather than surgeons, saw off great limbs, calling it "trimming." One of this type filled with concrete a great cavity in an important family tree, making no provision for the rolling of the cambium. Water got in easily, rot was accelerated, and the tree had to be removed.

In another case, capable workers spent an unconscionably long time on two decrepit silver maples, at a frightful cost to the owner. Honest advice to him would have been that the trees were not worth the cost of repair, and that they would live awhile as they were, better trees being meanwhile encouraged to take their places.

The rapid expansion of tree surgery has led to the employment of men not at all acquainted with trees, or sympathetic with them. One such, probably knew the surgery part well enough, but did not know apart a pear and a persimmon! Tree-surgeons ought to be tree lovers and tree knowers, if I may force a word.

If tree-surgeons should know trees, then they could do more for trees than repair the mechanical injuries to which they are subject. The real tree-doctor ought to know about insects, and fungous diseases, and spraying and fertilization. He ought to be welcomed, whether he ever laid hand on a tree or not, from the assurance he could give to the tree owner as to actual conditions.



FOUR YEARS LATER

Note the result of scientific tree surgery. The bark has completely overgrown the concrete filling and the bolts and the tree's appearance indicates its healthy condition and sturdy development.

What about tree-surgery? It is, I believe, a proper and wholesome practice, if sensibly pursued and sensibly used. As I have hinted, there are frauds and fakers practicing it, just as frauds and fakers operate on men and women. They are in the minority, in both cases. The facts of tree repair are accessible to any one, as, for instance, in Dr. Bailey's great "Standard Cyclopedia of Horticulture." The practice of the work needs skill and experience. A tree-owner can decide for himself as to the essential importance to him of any certain tree; and he can get the opinion of an honest tree-doctor; or rather his diagnosis. Much good work has been done in tree repair, and more ought to be done. Many old trees exist in locations where they mean much to the nearby home or to the landscape. No newly planted tree can replace them, at least for decades of time. Such trees may often be given a new lease of life by thoughtful tree surgery. To me, there is a certain definite gratification in the realization that I have done my best for an old friend, that I have stopped the decay of his structure, and given his life processes free sway. A tree is a living organism to me, and I dislike the very thought of seeing such a marvel of God's creation in distress.

Tree-surgery is with us to stay, just as is the treat-



THE OPERATION COMPLETED

Note how this maple on the grounds of the Dan River Cotton Mills, Danville, Va., was treated in 1913. The concrete filling and the bolts can be plainly seen in the picture.

ment of feeble-minded or crippled children. It is a work of mercy, and it evidences respect for age or dignity. It should be applied with good sense and good judgment. As I have said, tree-surgery ought to be joined to tree diagnosis and to tree doctoring, so that whatever was necessary for the prosperity of trees under consideration could be supplied, whether it be spraying, or protection against insects, or the repair of injured or decayed portions.

VALUE OF GRAZING MANAGEMENT ON THE CARIBOU NATIONAL FOREST

BY C. H. SHATTUCK

Professor of Forestry, University of California

CARIBOU National Forest has developed the management of its grazing lands probably to a higher degree than any other forest in Idaho.

It has been the writer's privilege to spend parts of two summers in an intensive study of the range and the methods employed by the officers in charge of this work, and to note carefully the present conditions as well as to make many comparisons of the present methods, and the results obtained by these management operations with former conditions and methods.

Ten years ago many parts of the range in Idaho were badly overgrazed. This resulted in the increase of the non-palatable plants, the decrease of the valuable forage plants, especially the better grasses, the destruction of the young trees, and often in severe erosion. All of these results were bad for the range and therefore for the men devoting themselves to the highly important industries of stock raising and wool growing. The general attitude of these men toward the future of these industries was extremely pessimistic. They were discouraged. They felt that there was far too much stock on the range for the good of either, and that the encroachments of the settler and new stockmen would soon ruin what had been a great and profitable industry. Many of the older men would talk of the good old days when the range

was *good* and there was no strife and contention among them over the grass and water. But a large number of them had come to regard grazing as a badly overdone business which had seen its best days and was rapidly on the decline. The Department of Graz-

ing of the United States Forest Service began some nine years ago to work out a system of grazing management with the general object of improving the conditions of the range and the range business. How was this to be accomplished? The problem was of vast magnitude, and was involved and complex. To

begin with, the stockmen themselves had few suggestions as to how the range could be improved. In fact, most of them said it could never be done. A careful analysis of the situation revealed the fact that very little definite information was at hand with which to undertake the solution of such a tremendous but highly important problem.

Five general objects were deemed highly desirable and therefore most valuable to be secured.

Greater production in the amount of forage plants.

Improvement in the class of forage plants.

Closer utilization of much of the range lands both as to forage and water.

Improvements in the methods of handling stock.

A better system of protection of young forest



CATTLE GRAZING ON THE CARIBOU NATIONAL FOREST

Forage of this region has greatly improved during the past six years owing to proper handling of the stock and the range.



CATTLE AND HORSES TOGETHER.

These are to be found on the higher alpine meadows of the grazing range, Caribou National Forest.

growth against fire; and against excessive browsing; protection of range animals against poisonous plants and predatory animals; protection of the soil by avoiding excessive or very early grazing, and of the forage plants by proper rotation and deferred grazing.



RANGE CATTLE ON GRAZING LANDS

The types of range cattle showing different breeds and condition of each as seen on the Caribou National Forest grazing lands.

In order to decide on the best methods to be employed for securing each of the foregoing improvements it was necessary to spend much time and money and employ considerable scientific and technical assistance. Also the experience and knowledge of the practical stockmen had to be drawn upon in no small degree.

In attempting to solve the problem of greater forage production certain studies were undertaken. One great fact was admitted by all, namely: that the range was gradually deteriorating both in the number of varieties of range plants and in the number of individual plants of the better varieties. First a careful grazing reconnaissance was made. This gave the topography, the types of plants, the per cent of ground-cover, the number of forage acres, etc. Then certain plots known as quadrats were carefully selected on which intensive studies of the plants were made. All the plants were named and carefully located on charts before the area was grazed; some of these were fenced and not grazed at all; others were grazed as the rest of the range; and others were grazed after the seed had fallen. These plots were carefully charted each year both as to the number of plants and the number of species. Also large numbers of range animals have been weighed repeatedly and careful records kept relative to their condition and that of the range. As a result certain fundamental facts have been very definitely determined, of which the following are the most important: that continuous and close grazing before the seeds fall causes a diminution not only in the number of individual plants, but also in the num-

ber of species of the more palatable and highly nutritious forage plants; that grazing in the early spring when the ground is soft is very injurious to the range, especially on hillsides and in marshy meadows where many plants and seeds are thrust down into the mud to perish, while others are stunted or destroyed because such ground dries out much worse later in the year than ground not so "cut up" by the feet of the grazing animals. It has thus been found that the amount of forage can be considerably increased by a close study of the actual conditions and the causes producing them.

It has been found that the class of forage plants gradually becomes poorer if the plants are not given an opportunity to mature and drop seeds at least every third year. Therefore it is now planned to defer grazing on each area as often as practicable until after the seeds have fallen. As a result of this practice the class of range plants has been steadily improving as anyone who has been at all familiar with former conditions may at once observe.

A closer utilization of the range both as to forage and water has in many places been brought about by studying the palatability of various plants for the different kinds of stock and for each kind of stock at various periods of the grazing season. For instance, the so-called green dock (*Weyethia amplexicaulis*) is greedily eaten by sheep if grazed about the time of flowering, but only sparingly later in the season; it and many other plants can be utilized much closer by being grazed at the proper time. Again, many parts of the range have been much more closely utilized by developing watering places in such a manner that the stock is not compelled to travel as great distances for water as formerly. A single spring dug out and piped into a series of watering troughs may be the means of utilizing from 2,000 to 5,000 acres of good range which has heretofore been useless for want of this water-development work. It is gratifying to see that many acres formerly of no worth have become highly productive by this means.

Much improvement has also been made in the methods of handling stock on the range, the close method of herding sheep has now been practically abandoned, and where considerable areas were formerly rendered useless for one or more years as a result of continuous bedding in one place, the range now remains uninjured by the new method practiced of shifting the bedding grounds after one or two nights spent at once place. Shifting the salting places is another method for saving the forage from excessive tramping and cropping, thus greatly protecting the more palatable and highly nutritious species. Also it has been found that closer utilization of the range can be secured by ranging both sheep and cattle on some

kinds of range at different periods of the grazing season. Sheep, for instance, following cattle, may find much good forage which the cattle have not injured, and vice versa.

Finally, the great subject of protection has been studied from every angle, and every phase of it has been improved. Formerly the range was annually burned off, the young tree growth largely destroyed, and each year large areas of standing timber were killed by these fires which were oftentimes set by the stockmen themselves to, as they thought, improve the range. This practice has been discouraged and prohibited as has the practice of excessive browsing which also did much injury to the young tree growth. As a result of these wise measures the forests on the Caribou are everywhere advancing and improving.

The range animals are now protected in a large measure against danger from poisonous plants, areas containing large numbers of such plants being marked and stockmen informed. Predatory animals and those injurious to the range are trapped, poisoned, and shot in large numbers. The soil is protected from erosion by wind and water because it is now much more evenly covered with plants than formerly, due to the improved methods of rotation, deferred grazing, and the avoidance of early or excessive use of any portion of the allotments.

On the whole, when one who knew the range ten years ago studies the same areas today and notes the great improvement in the forage, in the stock, and in the contentment and general satisfaction of those now engaged in the grazing business, he is amazed. Anyone who comes to see and understand all that has been planned and accomplished for the good of the range can have only words of praise for our wise Government in inaugurating a system which has produced such remarkable changes for the better over such vast areas. No one now wants to go back to the days of

the over-crowded and unprotected range. The range business today is on a firm and thorough-going basis, and the stockmen and settlers should be thankful to the Forest Service for the methods so carefully planned and ably worked out by its officers and technical



OPEN METHOD OF SHEEP HERDING

This is the method now generally practiced on the Caribou National Forest. The scene here photographed is on the Morgan Meadows.

men. These methods are also a great aid to the farmers both directly and indirectly. The farmer who desires an allotment is directly benefited because he now gets better range and absolute protection; he may also be helped indirectly because the range business is now on such a stable plan of operation that he may count on a sure and excellent market for his grain and hay each year. This is because the stockmen are sure of their range both in the quality and quantity of their allotments and are therefore willing to pay good prices for the feed necessary to bring their stock through the winter and back to the range in the best possible condition. Thus the entire western region has been immensely benefited by the improved methods of grazing management as now practiced on the Caribou and many other National Forests.

TAKE ADVANTAGE OF LARGE TREE SEED CROP

THIS year promises an unusually good crop of forest tree seed. Farmers owning woodlots should bear this in mind and make thinnings and cuttings wherever possible. Now is the time they say to get into the woodlot and inspect the trees before cutting. The trees can best be examined while they are in full leaf. All old, over-mature, decaying or otherwise unhealthy trees should be taken out at the earliest opportunity. Trees which are taking more than their share of light and space as well as those trees which are badly over-topped by their neighbors should go. Avoid making large openings in the woodlots, but plan on having any closed up within three to five years. A good crop of tree seed will do much to keep the land from going wild, but the woodlot owners must be careful not to cut too heavily.

POPULAR INSTRUCTION ON THE USES OF LUMBER

CORRESPONDENCE has been started by the National Lumber Manufacturers' Association with some 30 colleges and universities with regard to the giving of popular instruction upon the uses of lumber. The University of Wisconsin offered such a course two years ago, and similar courses were later offered by 10 or 12 of the leading schools. Since the war began there have been such great advances in the prices of all other materials, and such actual scarcity of some of them, that now is the best time we have ever seen to talk the right use of wood as a building material. The attention of the schools is being called to these facts, and it is expected that considerable interest will be aroused in instruction along these lines. It is proposed later to outline also a course of instruction upon structural timber for engineering students.

THE MOCKINGBIRD FAMILY

(Mimidae)

BY A. A. ALLEN

Assistant Professor of Ornithology, Cornell University

WHAT the nightingale is to Europe, the mockingbird is to our southern states. There is this difference, however, that the nightingale has but one beautiful song, while the mockingbird enriches his repertoire with the notes of many other birds. In fact, there is a record of one mockingbird which imitated 32 different species during the course of ten minutes' continuous singing. All individuals are not good mockers, however, and perhaps the majority confine themselves to their own brilliant notes. And brilliant their songs are, for the mockingbirds have marvelous technique and, while some people complain of their lack of feeling, others declare that they excel even the nightingale and the American thrushes in their emotional outbursts. They do not seek the deep forest and perhaps for this reason their music is less appreciated. "But," says Dr. Frank M. Chapman, "listen to him when the world is hushed, when the air is heavy with the rich fragrance of orange blossoms and the dewy leaves glisten in the moonlight, and if his song does not thrill you then, confess yourself deaf to Nature's voices."

Often it is the fence post in the garden, the ridgepole of the house or the top of the chimney that the bird selects for his songs and often he seems not to leave these spots

for days at a time, pouring forth one continuous burst of music from dawn until dark and from dark again until dawn. At times he seems carried away by his song and springs into the air with quivering wings and trembling throat only to alight again with renewed enthusiasm. In fact, his wings seem at all times to feel the harmony and try to find some way of expressing it.

This is at the height of the courting season when no other mockingbird dare trespass upon his domain or venture to glance at the mate that he is defending, without inviting a combat. For his inspiration for singing is equalled by his ardor for fighting whenever another bird appears. Nor does he confine his pugnacity to others of the same species. Any enemy, real or supposed, cat, dog, hawk, owl, or man, has to suffer equally, receive his scolds, his buffeting and even the sharp pecks from his bill, if it venture too close to the nest. Mockingbirds are the wardens of the bird community and the presence of an enemy is announced from one bird to another more rapidly than the enemy can travel until the whole neighborhood is alarmed.

There is but one species of mockingbird found in the United States, but the bird of the West is sufficiently



Photograph by G. A. Bailey

READY FOR A FIGHT

With such weapons as it has, the brown thrasher is always ready to defend its nest against man or any other enemy.



A HOME AMONG THE GRAPE VINES

Where there are thickets or tangles of vines, the catbird is always found. Where these disappear, the catbird goes with them.



MUCH LIKE THE THRASHER

The wood thrush is often confused with the brown thrasher, but its breast is spotted rather than streaked, and its bill and tail are shorter.

distinct to be recognized as a sub-species. The species ranges throughout the country in suitable places as far north as the 38th parallel and occasionally further, occurring sparingly in New York and New England. Southward it ranges through Mexico and Central America to South America and most of the West Indies, being a permanent resident in all but the northern part of its range. From Mexico to South America there are other



THE UNSPOTTED, GREENISH BLUE EGGS OF THE CATBIRD

The other members of the family lay spotted eggs, but all build nests of sticks and rootlets.

species, some ranging as far south as Patagonia, the total number being about twenty.

Our mockingbird is a slender, ashy-gray bird about the size of a robin, with white marks in the darker wings and tail. It is found about bushy pastures and the scrubby borders of woods, as well as about gardens, or indeed, wherever there is a thicket in which to hide and an exposed perch from which to sing. In some places along the Gulf it is the most abundant bird and its rich songs on every side drown out all the lesser bird voices of the vicinity.

The nest, which is a rather bulky structure of sticks and straws, rags and paper, is lined with rootlets and placed in a thick bush, an orange tree, a yucca, or even on the vines on the porch. The eggs are greenish-blue rather than heavily marked with dark brown.

In former years it was customary to keep mockingbirds in cages as pets because of their wonderful songs,



A BEWILDERED CATBIRD

A rag was placed across the eggs on the nest and the bird is here wondering what to do. It made no attempt to remove the rag but started to incubate beside it, illustrating the non-adaptability of the species.

and many birds seemed content to sing as beautifully from behind their bars as out in the open, even though their plumage usually became quite disheveled. These were birds taken from the nest when young and reared by hand, for adult birds, no matter how tame when free, would never submit to being caged. Instead they would beat their wings and peck the bars until they became covered with blood. Today it is a serious offense, punishable by heavy fines, to kill or to cage the mockingbird, for in most states there are laws forbidding the caging of native song birds. Likewise a Federal statute prohibits the shipping from one state to another or the importation of song birds native to this country, and more recently the Migratory Bird Treaty gives absolute protection in every state and in Canada to all insectivorous birds, the mockingbird among them.

Today, however, we care less for caging song birds for we have learned to attract them and hold them about our gardens by means of food and nesting places and protection from their enemies, so that cages are no longer necessary. Almost anywhere in the South, even in the heart of cities, if one has an extensive garden one can hope to have a pair of mockingbirds. He need only plant a suitable thicket for the nest, keep the cats away and put out plenty of food. In winter and early spring they are fond of suet, doughnut crumbs, pieces of bread and a few seeds, and later on of mulberries and other small fruits such as are borne on the dogwood, wild cherry, etc. Surely no garden in the South should be without its mockingbird.

There are over sixty species in the mockingbird family, only eleven of which are found north of Mexico. One of these is the true mockingbird, one is the catbird and the rest are called thrashers. The catbird resembles the mockingbird in being a long, slender, gray bird, but it differs in being darker and in not having the white bars in the wings and tail. Its only marks are a black cap, black tail and reddish-brown under-tail coverts. It gets the name "cat"bird from the harsh, catlike notes with which it scolds every intruder and with which it ruins an otherwise melodious song. Some catbirds are much better singers than others, many learning to imitate the notes of other birds with almost mockingbird skill, but all of them, sooner or later, interrupt their musical refrain with harsh mewling notes.

Catbirds are either very sympathetic to the troubles



A WELL PROTECTED HOME

The nest of a mocking bird in a yucca. All members of the mocking bird family nest in dense bushes or thickets—where they are safe from most enemies.

of all the bird world or very inquisitive, for whenever a bird is in distress and gives an alarm cry all of the catbirds of the neighborhood assemble to stare and to scold at the disturber. In the defense of their own nests they are seldom excelled for bravery, for be it cat, squirrel, snake or man, the intrepid birds bristle out their feathers and fly at the enemy with loud cries, pecking with their bills and buffeting with their wings in the attempt to divert attention from their treasures. Often they fall prey to sly cats which by stealthy leaps are able to reach them, but usually they slip out of reach into the thick vegetation, for the catbird always nests in the densest thicket, thorny bush or tangle of vines that the neighborhood supports. The nest resembles that of the mockingbird, but the eggs are deep greenish-blue without spots.

In parks and gardens where thickets do not exist the catbird is not to be found, for unlike some birds such as the phoebe, robin, barn swallow and swift that have come to associate with man, the catbird is always unable to adapt itself to changed conditions. A few years ago the author pointed out the difference between the catbird and the phoebe in this respect.

The phoebe formerly nested only on the face of cliffs, but with the advent of man and his bridges and buildings, it has modified its nesting habits to avail itself of these conditions and now builds wherever there is a ledge to support and another to shelter the nest. The catbird, on the other hand, has never changed and probably never will. That the two birds have a fundamentally different



A HUNGRY CATBIRD

When the catbird returns in the spring it can usually find plenty of insects to maintain its irrepressible energy. At times, however, a little suet is appreciated and it will come quite frequently to a feeding station.

make-up was shown by the simple experiment of laying a rag across the nest of each bird, thus concealing the eggs. With one look the phoebe grasped the situation, flew to the nest and pulled the rag away. The catbird, on the other hand, was unable to comprehend, examined the rag from all sides and finally began to incubate beside it with no attempt at removing it. It showed itself, thereby, a non-adaptable species, and thus we find it throughout its range.

In some places in the south the catbird is regarded with suspicion and is believed to rob the nests of other birds, but in the north it is a favorite and no stigma is attached to its name. It is very largely insectivorous and therefore beneficial, although, together with the robin and the waxwing and many other birds, it shows a partiality for cherries and other small fruits in their season. Where mulberries and wild fruits are available, the cultivated varieties seldom suffer.

The thrashers, numbering about twenty species, are the largest of the mockingbird family. Their center of distribution is in Southwestern United States and they extend southward through Mexico and westward through Southern California and Lower California. Only one species, the brown thrasher or "brown thrush," as it is sometimes called, is found east of the Rocky Mountain region. It occurs throughout the East as far north as Quebec and occasionally somewhat further.


Thrashers or "thrushers," as the word is sometimes written, are dark brown birds, more or less thrushlike in appearance, but larger, and more slender and have longer tails and somewhat curved bills. In fact, the word "thrasher" is thought by some to represent a "comparative" of the word "thrush," applicable because of the larger size of the thrashers. However this may be, the brown thrasher is often confused with the wood thrush, although it differs in its much longer bill and tail and its streaked rather than spotted underparts. It is a shy bird, much more often seen than heard, for it keeps to the undergrowth, where it scratches among the leaves or digs holes with its bill, in its search of larvae. The sound produced as it apparently blows the soil from its nostrils is an almost animal-like sneeze. When singing the male mounts to the topmost branches of a tree from which its loud ringing notes can be heard for long distances. The song is a rich medley and though limited in its range and confined to one air, rivals the mockingbird's in its exuberance and perfection.

Occasionally the thrashers live about gardens, especially if some effort is made to develop a tangle of shrubbery in which they can always find seclusion and safety from stray cats. Like the mockingbirds and catbirds, they will come to a food shelf for suet and crumbs and sometimes become quite friendly. They are equally ferocious in the defense of their nests, which are built in the heart of a thicket or on the ground beneath a tangle of vines, and they do not hesitate to peck and scratch one venturing too close. Their nests resemble those of the catbirds and mockingbirds, having an outer

layer of sticks and a lining of rootlets, but the eggs are different from both, being rather slender, grayish in color, finely and evenly speckled with brown.

The curve-billed thrasher of Texas and New Mexico, the Palmer thrasher of the cactus deserts of Arizona, the California thrasher of the Pacific Coast region and the Crissal thrasher of the whole Southwest are all about the size of the brown thrasher, but are less strikingly marked, being uniform shades of brown or gray with few streaks. The sage thrasher is a somewhat smaller bird, appearing like a small mockingbird with a streaked breast. It is one of the commonest birds of the sage brush country and has much the same habits as the other members of the family.

LUMBER FOR THE EXPEDITIONARY FORCE


 WENTY-FIVE million feet of lumber and timber are wanted in France at an early date, it is reported, for the use of the American expeditionary forces. This will supply some of the needs of the troops for forest products until the American forest engineer regiments reach France and begin cutting.

It is reported that 10,000,000 feet of lumber and timber should be delivered in France by September 1, 8,000,000 feet by October 1 and 5,000,000 feet additional by November 1. All this is said to be in addition to the 4,000,000 feet of dock timber and lumber for which the engineer corps of the army opened bids July 21.

The material wanted for use in France is described by lumbermen as square and sound. It is needed for wharves and docks, railroads, bridgework and terminal construction. It is said that it may all be bought within a hundred miles of the seacoast in order to insure prompt delivery.

Samuel M. Felton, president of the Chicago & Alton Railroad, who is in charge of arrangements for the ten or twelve regiments of railroad engineers for service in France, is much interested in the plans for buying American timber and lumber for use in France.

FORESTERS IN DEMAND

 Y reason of the enlistment of numerous foresters throughout the country for service abroad the war is making a heavy demand upon the forestry profession. Further, the war-time demand for forest products for a thousand uses from wood alcohol to bridge timbers means increased activity in the lumber business which employs many men having forestry training. The national and state forests of the country must not be neglected in the face of so great need for their products, which points to the increased opportunities for men in this young but important profession.

"FORESTS do not improve by disuse any more than a man's muscles grow stronger in idleness." The farm woodlot is a small forest and will repay the owner who takes care of it.

QUEEN ANNE'S LACE; THE PAPAW TREE, AND SELF-HEAL

BY R. W. SHUFELDT, C.M.Z.S.

NEXT to a big field of ox-eye daisies in June or July, we have no wild flower display in the eastern half of our country that can in any way compare with an old pasture field, overgrown with Queen Anne's Lace, or one which in reality is more thoroughly picturesque (Fig. 1). Of course, our farmers have long ago ranked the plant among the most vicious of weeds and an arrant pest, and he finds no trouble or lack of facts to support the execrations he is ever ready to heap upon its name. In so far as his material interests are concerned, he is doubtless quite correct. To the lover of wild flowers, however, the plant has everything that is beautiful of its kind to offer—everything that appeals to the lover of life out-of-doors. Ages ago, it was a common plant of many parts of Europe as well as of Asia; and, as Neltje Blanchan truly remarks: "From Europe it has come to spread its delicate wheels over our summer landscape, until whole fields are whitened by them east of the Mississippi. Having proved fittest in the struggle for survival in the fiercer competition of plants in the over-cultivated Old World, it takes its course of empire westward year by year, finding most favorable conditions for colonizing in our vast, uncultivated area; and the less aggressive native occupants of our soil are only too readily crowded out. Would that the advocates of unrestricted immigration of foreign peasants studied the parallel example among floral invaders."

The entire structure of the plant makes for this marvelous extension over vast areas; not only is it hardy by nature, exempt as food for cattle of any kind, but nearly a hundred different species of very industrious insects take part in its thorough fertilization. Indeed, blooming as it does all the way from June to September, it thrives during that part of the year when insect life is

most abundant and varied. Thousands of the wasps that construct the paper nests are among the forms that may be seen in any field of Wild Carrots—as some people are pleased to call them—though wild carrots they surely are not, notwithstanding the fact that the big, fleshy root looks like a carrot. Armies of beetles, bees and many kinds of flies also do their part in fertilizing the flowers of this plant; in fact, it well repays one to visit a field overgrown with Queen Anne's Lace, and, magnifying glass in hand, study the remarkable structure of the tiny, individual flowers as well as the hosts of insect forms that visit them in August. Even the flower shown here in Figure 2 may be studied with profit by the aid of a good lens—which the reader can easily demonstrate by trying it.

So well known and distinctive is this plant that it quite obviates the necessity for giving a detailed botanical description of it here. One may readily turn to this in any reliable work on American wild flowers. It may be as well to note, however, that the flowers of this conspicuous biennial are arranged in umbels; that its stem is bristly, and that its leaves are pinnately decomposed. Many people call it "bird's nest" because late in the season the flower-stalks erect themselves to form a con-

crete mass, not altogether unlike in form the nests built by some birds.

On one point authors differ with respect to these flowers. Neltje Blanchan says that they possess a "suffocating odor," while Alice Lounsberry remarks that they are "scentless." Truly it may be said that, through their rather strong odor, a field of



AN ARMY OF QUEEN ANNE'S LACE

FIG. 1.—View of a meadow in August monopolized by Queen Anne's Lace, a widely known plant of the Parsley family (*Daucus carota*).

them may be perceived at quite a distance, provided the wind favors its conveyance to the point where you are standing. It possesses a sort of wild, out-of-doors, waste-field pungency that is by no means altogether disagreeable.



QUEEN ANNE'S LACE IN FULL FLOWER

FIG. 2.—Note the one in the middle which has been generally fertilized, and is now closing up. These hollow "nests," late in summer, are familiar to all who know the plant. Note the central dark purple flower in each umbel of the other two, a feature that may be absent in some. The beautiful green beetles on the plant are well known to collectors.

Not a few of our native trees possess very beautiful blossoms; and, as they stand among our wild flowers, they legitimately come in here for occasional description. The blossoms of our Papaw tree are among the most interesting of these, and fine specimens of them are here shown in Figure 4, while the semi-ripe fruit is shown in Figure 5. Charles S. Newhall, in his work on "The Shrubs of Northeastern America," states that the flowers of the Papaw are "dull purple, in drooping clusters, appearing with the leaves." That they are in drooping clusters is far from correct, as may be seen in the accompanying illustration. The blossoms are of a very deep liver red, bordering on dark purple; as a matter of fact, they come out at the time when the thin, obovate-lanceolate, pointed leaves appear. Our North American Papaw (*Asimina triloba*) is the sole representative of the Custard Apple family (*Anonacem*) in this country, while it has many trees and shrubs related to it in the tropics; these belong in the same family. Note that the flowers



THE SLIMY SALAMANDER

FIG. 3.—While collecting flowers in the damp woods in August, one may meet with the Slimy Salamander (*Plethodon glutinosus*). This beautiful little batrachian ranges from Canada to Florida, and westward to Texas. It is generally black in color, finely speckled with pale gray. The reproduction here given is from a photograph from life, and gives the specimen natural size.



FLOWERS AND YOUNG LEAVES OF THE NORTH AMERICAN PAPAW

FIG. 4.—The fruit is edible in the autumn, and in its half-ripe stage is shown in Figure 5.

have six rather thick petals, arranged in two rows, the outer set being the larger. A globular mass in the center is made up of numerous stamens. The pistils are few in number, and when they mature and ripen they come to be a large, pulpy fruit, having the form of the one we see in Figure 5. These range from six to fourteen centimeters in length; and while a palish green at first, and slightly speckled, they gradually turn a deep brown or almost black. At this stage they are ripe and possess a soft, sweet, custard-like pulp, which many people appear to relish in the early fall. Papaws are found growing only along the banks of streams and rivers, often surrounded by the aquatic plants and shrubs found in such places. Some of the trees may attain a height of from twelve to fourteen feet, while others are stunted and shrub-like. One of its peculiarities is to give off rather a disagreeable odor when the smooth, pale grey bark is bruised in any manner. The flat seeds of the fruit are not numerous and are arranged horizontally.

Papaws are found growing in many localities throughout the eastern parts of the United States, and of recent years they have received no little attention on account of the demand for the ripe fruit in the autumn. The



FRUIT OF THE PAPAW

FIG. 5.—Papaw trees grow luxuriantly along the Potomac River, on the Maryland and District sides, above Washington. The insect shown resting on the fruit is a common cicada, popularly known as the "locust," which is erroneous, as the American locust is a very large grasshopper.



A MUCH DESPISED WEED

FIG. 6.—The plant and its flowers here shown is a specimen of *Prunella vulgaris*, popularly known as Self-heal, Heal-all, or Carpenter-weed, with some dozen or more other names in the vernacular. It is a plant with a history, and occurs over large areas of country in North America, Europe, and Asia. The example here shown was collected in the District of Columbia, and Gray states that a variety of it, *P. laciniata*, is "said to be introduced near Washington, D. C.," where, it may now be added, it is very abundant.

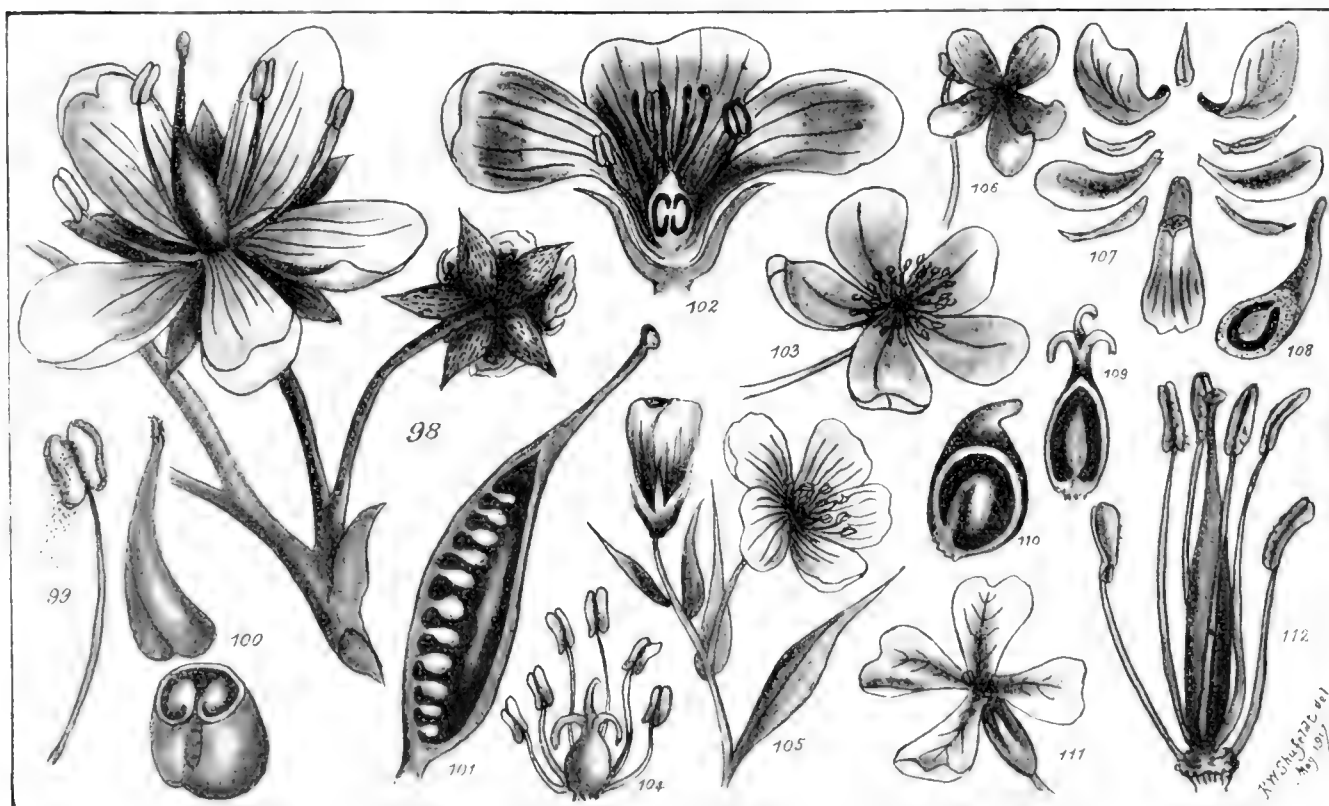
leaves become very large and long by August, while the flowers may appear as early as the last days of March. It receives its generic name from Asiminier of the French colonists, and this from the Indian name *assimin*; its specific name, *triloba*, from the flower structure described above.

We have a large family of wild flowers in this country known as the *Labiatae* or Mint Family, so called on account of the labiate form of the corolla. Small glands are scattered over the leaves containing a volatile oil of a warm, aromatic pungency, for which mints and their allies are well known. Many familiar plants are contained in the group, such as Bugle-weed, Germander, Pennyroyal, Blue Curls, Skull-cap, Cat Mint, Horehound,

Giant Hyssop and the Horse Mint and Sages, Nettles, and so on. Among this very interesting assemblage we find a modest little plant widely known as Self-Heal (*Prunella vulgaris*). This flower is not only found in the woods and open fields, but it grows abundantly along the roadsides in the country districts. Here it is often thickly powdered with dust, and appears to be but a shabby, good-for-nothing weed; but a summer shower soon washes off the dust of the roadway, and a most beautiful little plant is at hand for study and admiration. Upon referring to Figure 6 we can appreciate what Gray says of *Prunella*: "Low perennials, with nearly simple stems, and three-flowered clusters of flowers sessile in the axils of round and bract-like membranaceous floral leaves, imbricated in a close spike or head." As will be noticed, the leaves are ovate oblong in outline, and their margins may be either entire or toothed, petioled, pubescent or somewhat smooth. The two-lipped flowers are very rarely white, but most often violent or creamish flesh color, being almost twice the

length of the calyx, which latter is of a purplish color. The flowers are well shown in the accompanying cut, and by its aid the plant can be easily identified when taken in connection with the above description.

Prunella was formerly written *Brunella*, from the old German word *bräune*, which means quinsy, and all the old herbalists believed that Self-Heal would unfailingly cure that disease, or indeed any other malady affecting the throat. It was also employed for many other ills, and may still be so employed in the country districts. Originally the plant came from England, and after its introduction here the flowers gradually became a much paler shade of purple. In England it is also known as "carpenters' herb" for the reason that, when carpenters bruised themselves in any way while at work, they relied entirely upon a decoction of *Prunella* to cure the resulting inflammation. It was also used by the French, and the country people of that nation still have the saying that "No one wants a surgeon who keeps *Prunelle*."



THE FLOWER AND ITS PARTS

Fig. 98, the parts of an average flower, showing the five petals in its corolla; the five sepals composing its calyx; the pistil rising from the center, the enlarged base being the ovary, followed by the slender style and surmounted by the stigma. There are also four stamens shown, each springing from the base of the pistil, and each bearing at its upper free end an anther. Fig. 99 shows a stamen detached, with its double anther on top, from which the dust-like pollen is falling. Fig. 100 is the pistil cut in two transversely, showing the seeds within, while Fig. 101 gives the same sliced longitudinally, exhibiting the arrangement

of the seeds. Fig. 102 is an average flower sliced vertically through its center, and it shows three petals of its corolla; the section of the sepals of the calyx; the ovary containing two seeds, with the multiple styles of the pistil, and the stamens. Fig. 103: Some flowers are incomplete in that they have no petals (*apetalous*), and the one here shown is the flower of the *Anemone pennsylvanica*. Fig. 104: A flower may also be naked and yet perfect, as in the case of the Lizard's-tail, here shown. Fig. 105: Here is the flower of the Common Flax; it is not only symmetrical, but likewise perfect, regular, and

complete, having all of its parts in fives; it is shown bisected in Fig. 102. Fig. 106, anterior view of a common Violet and Fig. 107, its five petals and five sepals dissociated. Fig. 108: An ovule or seed, when it is said to be suspended in the ovary,—that is, hanging perpendicularly from the summit of the ovarian cell. When situated as in Fig. 109, it is said to be erect, and in Fig. 110, ascending. Taken in the order given, these are the ovaries of the Anemone, the Buckwheat, and the Buttercup. Fig. 111 gives a cruciform flower (Mustard), and Fig. 112 its pistil and stamens removed and much magnified.



LEAF TERMS

Plants, such as the Iris (Fig. 113), present no distinction of petiole and blade, and on section their narrow leaves are arranged as in Fig. 114. In the Pitch Pine (Fig. 118) the three needle-shaped leaves form a fascicle or bundle; a short sheath surrounds this at its base, furnished by the thin scales of the axillary bud. In the Larch (Fig. 124) the arrangement is much the same, as it is, too, in the Spruce. Such leaves are called awl-shaped. Another kind are the scale-shaped, such as in the Arbor-vite (Fig. 115), Juniper, and the Cedars. Here the scales which represent the leaves are in great numbers, and they gain the required spread of surface in this way. Petioles that expand and flatten, thus taking the place of the blade, are termed *phyllodia*, such as in some Acacias (New Holland).

The stipules present as many variations as the petioles, and their extremes are to be seen in the Pea, the Magnolia, Tulip Tree. In the first they make a conspicuous part of the leaf, while in the beans they are more or less minute. In the Cloves they are united with the base of the leaf-stalk (Fig. 117), while

in the Prince's Feather (*Polygonum orientale*), Fig. 116, the stipules unite to form a sheath for the stem. The *ligule* corresponds to the stipule in some of the grasses, where the sheaths support the blade on their summit, and it occurs on its apex. There are two principal arrangements of leaves on the stem, alternate (Fig. 122) or opposite. When alternate, the single leaves spring, one after the other, from each joint (node) of the stem, and when opposite, there is a pair of leaves at each joint of the stem—one leaf of any of the pairs being exactly opposite its companion on the other side of the stem. When a circle is formed of three or more leaves about the joint as in the Bedstraw (*Gallium*), the arrangement is said to be of the whorled or verticillate variety. The rule is unerring which determines the place of a leaf upon the stem in the case of any plant; it appears at its pre-destined point with mathematical accuracy, and the special formula in any case holds true for all species in the vegetable kingdom. Figures 119-123 throw some light on these formulæ.

It is not at all likely, however, that it has been used in the present horribly destructive war in France.

When we come to study the leaves of the plants here figured in the cuts, as well as in those in previous articles, or, indeed, in trees and plants in general, it will have to be observed that never more than *one leaf* springs from the same point on the stem; but, should two arise from the same joint, they are always situated on opposite sides of the stem, the distance of half the circumference separating them. If there should be more than two, as in whorls, they are placed equidistant around the joint of the stem, being separated by one-fifth, one-fourth or one-third of the circumference of the stem from each other, depending upon the number of leaves. This assures their being at the greatest possible distance apart, and we never see two or more leaves standing side by side at the same joint, nor are they ever clustered or one above the other. Clustered or *fusciated* leaves are shown in Figure 124 of the Leaf Terms to the present article; they represent leaves of an entire branch crowded

into a fascicle. Trees of the Pine family should be closely studied to work out such problems as these.

Leaves do not make their appearance on trees and plants in a haphazard manner, but spring normally from points which appear on the stem with absolute mathematical precision. Their arrangement is uniform for the species, but not the same for other plants.

From this it is clear that the greatest possible divergence is where the *second leaf* is found on exactly the opposite side of the stem from the first one, with the third on the side opposite the second, and so on, and consequently over the first one, with the fourth over the second. Two ranks are thus formed, one on one side of the stem and one on the other. This, then, is the *two-ranked* arrangement. By varying the intervals or distances on the *spiral line*, it is easy to see how we also get a *three-ranked* arrangement, as well as the most common one of all, the *five-ranked*. It is very instructive to study these several arrangements on the stems and branches of the plants and trees we can collect.

In Figures 119 and 120 of the Leaf Terms on this

page, we have the *three-ranked* arrangement in the Sedge. The various arrangements are expressed by *fractions*; for example, if we find the formula to be $\frac{2}{5}$, which expresses the divergence of the *successive* leaves, the number of turns made by the spiral line around the stem is indicated by the numerator, while the denominator gives the number of leaves in each cycle, that is the number of perpendicular ranks. Passing through the series, we may even find a *thirteen-ranked* arrangement, as in the house leek, and its formula would be $\frac{5}{13}$. Ordinarily there are no arrangements known above $\frac{15}{33}$. The rule and symmetry of it is truly marvelous and known only to the comparatively few. Parts of it are too technical to be touched upon here; but it is well to remember one thing: leaves do not spring out on plants and trees everywhere and anywhere. Each leaf arises at a *predestined point*, and the entire foliage appears according to a rule, which

has been shown to be based upon principles involving the greatest possible mathematical accuracy.

The spiral arrangement is shown in the Leaf Terms in Figures 121-123, where a line is drawn through the insertion of the ascending spire of leaves, and so winds spirally around the stem; in the same species of plant there will always be the same number of leaves for each turn around the stem. "That is," says an authority at hand, "any two successive leaves will always be separated from each other by just an equal portion of the circumference of the stem. The distance in *height* between any two leaves may vary greatly, even on the same shoot, for that depends on the length of the *internodes* or spaces between each leaf; but the distance, as measured around the circumference (in other words, the *angular divergence*, or angle formed by any two successive leaves) is uniformly the same."

NEW YORK'S FOREST WEEK



FOREST week was celebrated at the Lake Placid Club September 4-8 by the New York State Forestry Association. The program included a series of indoor and outdoor conservation gatherings, for which a picturesque prelude was afforded by an Indian Council Fire, held under the auspices of the association in co-operation with the Conservation Commission, the State College of Forestry, the forestry department at Cornell University and the Lake Placid Club.

Among the features of the week were a five minute pagan sermon in the language of the Senecas, by Chief Sosondoa, (Edward Cornplanter) and Indian legends and fairy tales by the official story teller of the Iroquois, Yehsenowchs, (Miss Mabel Powers), in costume. An address was made by Charles Lathrop Pack, president of the American Forestry Association. Other addresses scheduled were:

"The New York State Forestry Association," President Herbert S. Carpenter; "Forest School Education for Boys," Professor L. H. Somers; "Forestry Work of the Delaware and Hudson Railroad," H. R. Bristol; "Wild Flowers of Forest and Field," H. D. House, State Botanist; "The Palisades Interstate Park," Dr. Edward L. Partridge; "Forests and Birds," Professor A. A. Allen; "Food Producing Possibilities of Our Inland Lakes and Forests," Professor F. F. Moon; "The Profession of Forestry," Professor R. S. Hosmer; "Conservation in the Adirondacks," Commissioner George D. Pratt; "The Timberland Owner and the Great War," Professor A. B. Recknagel; "A National Capital Forest," W. M. Ellicott; "Forestry and the Newspapers," Royal J. Davis, of the New York Evening Post; "The Forest Parks of New York State—The Motorists' Mecca," Eugene M. Travis, State Comptroller; "Water Storage in the Adirondacks," a paper by John G. Agar, President of the

Association for the Protection of the Adirondacks, presented by Edward Hagaman Hall, secretary; "Forestry and Education," United States Commissioner of Education P. P. Claxton.

INDIANA'S FORESTRY WORK



IN advocating greater attention to reforestation the Indiana State Board of Forestry calls attention to the United States Geological Survey's estimate that at the present rate of consumption the coal supply will be exhausted within 50 years. It is pointed out that thousands of acres have been cleared that should not have been cleared and that no warring foe ever threatened more certain destruction than does neglect to conserve natural resources. The people are urged to sow now that they may reap in the future.

For this year's Indiana state fair particular attention has been paid to the forestry exhibit. Under the management of President W. A. Guthrie and Secretary Richard Lieber, of the state forestry board, the exhibit was made possible by generous aid from the state and the United States Forest Service, with the willing assistance of lumbermen and manufacturers of wood products. One of the features is a working model showing the erosion of land. This illustrates how the forests on steep hillsides conserve water supply and feed springs, wells and rivers. It also shows how the same hill, when cleared, becomes washed and does not produce enough to pay taxes. In the exhibit of native woods is included a sample of every variety of tree indigenous to the state. Other exhibits include colored photographs of birds, with a chart to show the percentage of insects and weed seeds entering into the diet of the birds. Forest fire effects are shown in specimens of trees damaged by fire.

TURNING A DESERT INTO FERTILE SOIL

BY ROBERT H. MOULTON

ONE of the most remarkable examples of soil transformation to be found anywhere in the United States is on the farm of Mr. A. N. Abbott near Morrison, Whiteside County, Illinois. In six years Mr. Abbott has accomplished the seemingly

dollars an acre. Mr. Abbott's farm lies on the edge of the so-called River Bottoms, three or four miles east of the Mississippi River. When in geological ages the channel of the Mississippi was changed, the sand in the old river bed was blown up on the east side of



SHOWING HOW A TRANSFORMATION IS POSSIBLE

In the background may be seen a tract of barren sand; in the foreground is a tract formerly without a trace of vegetation on which grass is now growing because of the protection of the line of trees in the middle distance. To the right is part of the forest plantation.

impossible task of turning some seventy acres of sand, formerly as barren as the Desert of Sahara, into a flourishing forest. Nor is that all; for this forest, acting as a sandbinder, has been the means of saving other fertile acres from the inroads of the drifting sand, the total result being that Mr. Abbott's farm has increased several times over in value. The sandy tracts, which before being planted to trees were practically worthless, are now worth anywhere from fifty to one hundred

the river, forming many sandy tracts. In time these tracts became covered with a sparse growth of grass.



THE ONE REMAINING BLOW HOLE

The trees in the background protect the corn field beyond. Note how the wind has scooped out the sand. This is part of the original seventy-acre tract of sand on the Abbott farm.

Then in a dry season the grass was killed, and the sand began to blow about, covering everything in its course. Such was the situation when Mr. Abbott came into possession of his farm.

Being something of an enthusiast in afforestation, Mr. Abbott determined to attempt the reclamation of the sand tracts on his farm. He was encouraged in the belief that trees could be



SIX YEARS AGO THIS WAS A BARREN BLOW HOLE

Since then the planting of black walnuts, locusts and cottonwood, together with a luxuriant growth of grass, has quite transformed its appearance.

made to grow there by the presence of one huge cottonwood tree standing almost in the middle of the tract. This tree also suggested the species which would most likely thrive in the sand. He also decided

ing of sand in their immediate vicinity, thereby protecting growing crops on other land nearby. He then went into the business of tree planting on a huge scale, planting about 70,000 trees altogether on some



TREES PLANTED IN SAND AT END OF A BLOW HOLE

These trees, cottonwoods, are now seven years old and act as perfect sand binders. The grass is beginning to creep into the sand in front of the trees.

to try the black locust, since, like the cottonwood, it has the faculty of storing nitrogen in the soil through the ministration of the bacteria on its roots.

The first year Mr. Abbott planted 5,000 yearling trees, and in a little over a year they were three or four feet high, and grass began to creep in between. In another year they had successfully checked the blow-



THIS TREE GAVE THE PLANTER HIS IDEA

This large cottonwood was the only tree on a seventy-acre tract of sandy soil when it came into possession of A. N. Abbott, and it gave the idea of planting other trees in the effort to reclaim the sandy wastes.

70 acres of land, or at the rate of 1,000 trees per acre, the spacing being about 6 by 7 feet. The yearling plants were bought at an average price of \$5 per thousand, and the cost of planting them was relatively

small, since two men could easily plant 3,000 trees a day.

The rapidity with which the sand drifted in many places is well illustrated by some of the accompanying photographs which show the original fence posts, set before the tree planting began, almost entirely covered.

Mr. Abbott has allowed one blow hole to remain unplanted, merely for the purpose of showing other farmers what can be accomplished in the way of reclaiming sandy tracts of land. This blow hole also shows in a manner most unmistakable how the trees

serve to lower the temperature. On the day these photographs were taken, in mid July, a test of the temperature in the blow hole indicated 115 degrees Fahrenheit (it has been known to go as high as 150 degrees) while over among the trees it was only 95 degrees. This difference was due, of course, to the fact trees drink in and transpire an enormous quantity of water, and this giving-off tempers the dryness of the nearby atmosphere. It is also a known fact that moisture-bearing currents of air are caught by forest areas as they are not by the heated plains.

THE LE CONTE OAKS

THE noble old liveoaks which flourish on the campus at Berkeley are one of the chief prides of the University of California. Wishing to pay tribute of love and honor to Joseph and John LeConte distinguished as scientists and beloved as teachers, a class dedicated to their memory one of the finest of the old oaks on the campus. These two brothers were born in Georgia, of old Huguenot stock, were professors in South Carolina College, and at the close of the Civil War went to California, where John LeConte became Professor of Physics, and later President of the University, while Joseph LeConte became Professor of Geology and Natural History. Although in the forties a pupil of Louis Agassiz at Harvard, Joseph LeConte was one of the first scientific men in America to maintain the truth of evolution. He served as President of the American Association for the Advancement of Science and as President of the Geological Society of America and when he died, in 1901, he left behind him many volumes of writings on geology, evolution, and many scientific papers.

Recently the University of California has had all the oak trees on its campus thoroughly cared for by the methods of modern tree-surgery, under the direction of J. W. Gregg, Professor of Landscape Gardening and Floriculture in the University.

The 520-acre campus of the University of California possesses a wealth of native California trees, shrubs and flowers. During the past five years the hill lands of the University, including the watershed of Strawberry canon, have been planted by the University with approximately a hundred thousand trees of many hundreds of species, the work being done with careful consideration of the purposes of the landscape gardener, the botanist and the student of Dendrology and Sylviculture. The University of California within the last three years has developed a notable Forestry School, headed by Walter Mulford, formerly Professor of Forestry at Cornell, the department including also David T. Mason, Professor of Forestry, and Woodbridge Metcalf, Merritt B. Pratt and Donald Bruce, Assistant Professors of Forestry.



THE LE CONTE OAKS, UNIVERSITY OF CALIFORNIA

Forestry for Boys and Girls

by Bristow Adams

ONE TELLS OF THE ADIRONDACKS



BOYS and girls, big and little and young and old, have written to me about the stories here set down. One says she likes them, another wants to know where I get my twisted history, and another tells me about my foolish notions on some other point. Mainly the letters have told that the readers like to know of the children about whom I write, or that other children have learned to look for interesting facts in forestry.

ONE boy, sixteen years old, has put down what he learned at first hand about forestry in the Adirondacks, the wooded mountains in northern New York. He went up there last year as a boy scout, to help protect those forests from fire, and to do his part in building trails into the wilder parts of the mountains. What he saw and heard he has written; and because it seems good to me I am passing it on to you.

This year, boys of his age have worked in garden and grain field; their camps have been headquarters for farm labor rather than for the more pleasant and more exciting work in the woods. All of us have had to do what we could to help the food supply; next year we shall have to do even more. I am hoping that there will be built up a habit of work, and that many Americans will get away from the present plan by which they "let George do it."

This boy who wrote about the Adirondacks is Beverly Galloway, and his father knows about all there is to know

about plants. The first thing that strikes Beverly about the Adirondacks mountains is that they form one of the largest pieces of wild woods in the country, and that they are in the same state that contains the largest city in the world. He tells how they first became known, through the discovery of deposits of magnetic iron. "A number of these mines," he says, "were worked in the hope of getting good rich ore, but they never amounted to much. Many people went there to help develop the mines, so when the mines failed, the workmen had to find other ways to make a living.

"FARMING was out of the question; the region was too rocky, even if the forest were removed. The forest was there; why remove it? Possibly it could furnish a means of livelihood. Indeed it could, as they soon found out. Within its borders were many creatures which could be trapped during the winter for their furs, or shot all-the-year-'round for their meat. And there was the forest itself. So the two industries of trapping and lumbering were started. Since new traps and other supplies had to be obtained from the outside, a means of traffic was started. As the output of the region grew, so did the traffic grow. But the lines did not go into every nook and corner of the mountains, but were main roads going north and south. So we have the Adirondacks of today,—easy to get at in a general way, yet with large portions out of the usual lines of travel. There are only a few railroads open to the general public, but a great number of private logging roads and railroads.

"Recently with the coming of the au-



tomobile there have come some good roads. But here again, as in the case of the railroads, the heart of the Adirondacks cannot easily be reached.

"AT FIRST only a few persons came in for vacations. These usually came during the hunting season. The next year they would return with friends. In this way the fame of the Adirondacks spread abroad. Hunting led to fishing, so the sportsmen not only came in the fall but also in the spring. Some of those who came in the spring stayed later and found that the summer climate was better than the 'lumber-jack' painted it. Then came summer hotels.

"These summer hotels are now to be found in nearly every place that is easy to get at. And since this mountain region is also a lake region, the ways of getting about were simplified. Now, in nearly every place where there are boats there are also guides, whose rates are from four to seven dollars a day. At first these rates seem high, but they are truly not so. Where in any city could one get a man who would paddle a canoe—provided there were places for a canoe to go—and paddle it for thirty miles, carrying it and all the baggage too over portages, make the camp and cook the meals, find fish and game, and keep one from being drowned or shot for a deer, all for seven dollars a day?

"THE lumber industry is still a big one. The old method of lumbering had to have the winter's snow. Roads were made to tap the heart of the best timbered country, and followed the lower and more level ground.

These roads were as free from bumps as city asphalt streets. When the first freeze came they were sprinkled with water; after several sprinklings and freezes they were covered with a layer of ice some inches thick. Heavy loads could now be hauled on sledges over these ice-ways with very little trouble. Even now the traces of these old roads may still be seen, leading from the heart of a pine section to some water course.

"WHEN the sawlogs had been cut and hauled to the banks of a stream they were piled at the edge of the water, or on the ice, with the log ends easy to get at. The marking was simple. On the end of a sledge hammer were raised letters, these letters being the 'trade mark' of the company doing the lumbering. When a log was to be marked its end was hit with the hammer and the dents left were the reverse of the letters on the hammer. By this it will be seen that the letters had to be made wrong-way-'round, or mirror-wise. After the logs had been driven down stream on the spring freshet to the mills below, every owner was able to claim his own logs.

"Now there are very few of these spring drives. The logging railroad has taken the place of the river, although horses are still used in skidding the logs to the rollways. At the present rate, unless some measures are taken to start new trees the supply in the Adirondacks will run short in something like twenty years. It takes time for trees to grow. They are not good for paper until they are twenty or

(Continued on next page)



FORESTRY FOR BOYS AND GIRLS

Continued from Preceding Page

thirty years old, and must be over fifty years old before they make good lumber. A beech and birch will take twice as long, and are not made into paper at any stage.

"On State land the lumber must not be cut. Fish and game are protected by state and federal laws well enforced by wardens

"The forests are protected from fire by lookouts, wardens and guards. At present there are not enough guards to stop large fires that may get started, so the people have to turn out and become fire-fighters to save their property. Outside of the State lands little has been done to renew the forest; but any who wish to take the time and trouble to plant may get young trees from the State, and a few have undertaken to replant. When all do this the future of the Adirondack forests will be sure."

Thus ends Master Galloway's story of the Adirondack region. Some day, as a forester, he may look back on what is, as far as I know, his first printed work on the subject. Looking back at it as a grown-up, will he think, as I do, that he found out a great deal, or will he then decide that he knew very little in the light of all the things he has learned since?

THE POISONOUS CICUTA

CANY deaths, both of human beings and domestic animals, are caused every year by cicuta, or water hemlock, a poisonous plant. It is the most violently poisonous of temperate region plants, yet it is not generally recognized. Cicuta is widely distributed. Unfortunately, it resembles a number of harmless plants and is not easily recognizable. It belongs to the same family as carrots and parsnips. It has a number of popular names, of which the most common is "cowbane," or "water hemlock." In the mountain regions of the West it is frequently called "parsnip," or "wild parsnip." Other names, less common, are "snake-root," "snakeweed," "beaver poison," "muskrat weed," "spotted hemlock" and "spotted parsley."

The plant grows in wet places and is especially common in some parts of the West along irrigating ditches. It has a thickened rootstock with roots which sometimes takes the form of a group of tubers. The cicuta is most readily distinguished from plants of similar appearance growing under the same conditions by the transverse chambers in the rootstock. Further description, except by botanical terms, is difficult.

Only the root of cicuta is poisonous. Cases of poisoning are more frequent in the spring, partly because the roots are more likely to be noticed at that time and partly because they appear to be more poisonous then than later in the season. Occasionally stock find the roots when they are washed out by high water in small streams. Farmers in their plowing sometimes bring to the surface a considerable number of roots and these are eaten by cattle, with resulting sickness and death.

SPRUCE FOR AEROPLANES

CAPT. DE LA GRANGE of the French aviation corps, says that Uncle Sam's greatest aid to the allies can be accomplished by aeroplanes, built of American spruce, of which large quantities are being shipped from the forests of the Pacific Coast both to American and English manufacturers. He says:

"If the Government wishes to, before the first of April, 1918, it can have a tremendous aero fleet. Suppose it decided to have only 5,000 planes and 10,000 motors. In order to keep that number of aeroplanes always at the front it will be necessary to build 2,000 planes and 4,000 motors per month, viz, 18,000 planes and 36,000 motors during the next nine months. Therefore, between January 1, 1918, and December 31, 1918, the United States must build 22,000 planes and 46,000 motors. This means a great effort on the part of the American factories. They can make this effort, as they have already the buildings, the workmen and part of the machinery needed. They have also a large number of the best scientists and technicians. The size of the orders given them will insure obtaining the money necessary to organize the plants for their construction."



Photograph by G. T. K. Norton

A FAMILIAR SIGHT TO WASHINGTONIANS

THIS "house" stands on the lawn or mall of the Department of Agriculture, Washington, D. C. It is made of a hollowed section of a red cedar and was first exhibited at the World's Fair; in pieces it was brought to Washington and set up, when the roof was added. It is sixteen feet in diameter; the lower portion is used for the storage of gardener's tools, while birds by the hundreds live in the upper story. The whole is a rich, dark red and is ivy-grown, and forms one of the most attractive bits of wildness in the city. The dome of the New National Museum building is seen on the horizon at the left.

OUR SNAKES A NATIONAL ASSET

BY GAYNE T. K. NORTON

THE fear of snakes, or to speak more exactly, the very general tendency to kill snakes on sight, is as universal as war. Some people associate the fear with mythology; others blame the misinformation that has been spread for generations. This state of affairs has existed—with disastrous effects to the snakes and injurious reactions upon ourselves—principally, I believe, because editors have not seen fit to change it. They have reasoned, and correctly, that the public, with few exceptions, would rather not be educated in herpetology.

With this summer, however, the millions of war gardens have given the snakes popular interest—a “news angle” editors must consider. The gardens are bringing outdoors many people who ordinarily would not tread from the paving blocks. Tremendously increased tillage is bringing people and snakes together.

Unless much educational work is done

the number of snakes that will be killed by the well-meaning but misinformed gardeners will be very large. Our snakes, and we are rich in reptile life, are a national



THEY KNOW AND DO NOT FEAR SNAKES

A group of hunters with some pet snakes from private collections. Allen Samuel Williams, founder of the Reptile Study Society, is seated in the foreground.



A CHARMER CHARMED

A khaki clad, soft shirted hunter who had never touched a snake until five minutes before the photograph was taken.

asset worth many millions of dollars. Snake killing will never become a national issue—conserved as an economic factor, destroyed as a menace—yet the snake, particularly at this time, should be conserved. The relation



WITH THEIR PET SNAKES

Allen Samuel Williams (left) with a large pet pine snake. Mr. Williams is an eminent herpetologist and naturalist, an authority on the American Indian, and a well-known author and lecturer. His knowledge of the ways of the wild things verges on the uncanny. He is perfectly fitted to lead the boys in the work of snake conservation. The writer is holding a large bull snake, another pet caught by Mr. Williams in the South.



Photograph by G. T. K. Norton,
by courtesy of New York Zoological Society.

A REAL "SNAKE CHARMER."

Gladys Ditmars is a born zoologist; she is the daughter of Mr. Raymond L. Ditmars, reptile curator of the New York Zoological Society. Gladys has traveled much with her father and absorbed much of his wisdom. She goes out of her way to save a snake's life. The king snake photographed is a pet she caught in southern New Jersey.

it bears to successful crops is important—more important than even the average farmer realizes.

Reptiles may not manifest friendship toward us, few would welcome such a condition, yet they are not enemies. They never attack unless in self-defense. Of our 111 species but 17 are poisonous—two species of Elaps, coral snakes, and 15 species of Crotaline snakes, the copperhead and moccasin, the dwarf and typical rattlesnakes. On the other hand the help they render is valuable. The pests destroyed each year, especially the rodents that injure crops and carry communicable diseases, roll up a large balance of good service in their favor.

Rodents are destroyers of farm products, cause loss by fire through gnawing matches and insulation from electric wires and of human life, through germ carrying, particularly the bubonic plague. Before the war the United States Department of Agriculture placed the bill

at \$500,000,000, one-fifth of which equals the loss of grain. With advanced prices this is increased.

They also destroy eggs, young poultry, squabs and pigeons, birds and young rabbits, pigs and lambs. A loss to husbandry not estimated in figures but realized as extensive is due to the killing of fruit trees by girdling or other injuries to the bark by species of wild rodents. Eminent medical authorities agree that many plagues can be accounted for by rodents. As a destructive agency the rodents have no rival.

The explanation of the big figures representing damage from the rodent is due to the vast numbers of those small animals owing to the characteristic fecundity of the species. One investigator paired two common house rats late in December. By the middle of the next September he had 880 rats.

Reptiles are a very important factor in the natural work of restraining the too rapid increase of rodents. Practically all our snakes feed largely upon rodents. One in particular which has a wide range is the *Lampropeltis*



AN OLD TIMER AND A RECRUIT AT SNAKE HUNTING

George Von Buchen (left), an ardent herpetologist of many years' experience and owner of a very unusual collection of serpents, is really not the sort of chap the photo makes him out to be, and Frederick Beebe, a new and enthusiastic recruit. George trusts the pine he holds, but Fred wants to see what the large gopher, or indigo, snake he has is up to. The gopher and king are the snakes which domesticate the best. They are both of great economic value.

doliatus triangulus (milk snake, house snake, spotted adder, checkered adder), which finds 90 per cent of its diet in small mammals. This reptile, together with dozens of others, is absolutely harmless, defenseless and in no way destructive, though many ridiculous tales are told about it.

The gross ignorance regarding our snakes causes slaughter of all things that wear scales and crawl. Farmers should protect and breed the harmless snakes rather than kill them. Many European countries have protective legislation. Another fact: all the king snakes, and the family is large, are natural enemies of other snakes and eat many of them. In numbers they probably overbalance the poisonous species and by general distribution usually occupy the same habitat as the dangerous snakes. In this way they materially help to lessen dan-



SOME HIGHLY PLEASED HUNTERS

These snakes were caught on the first hunt of the season and among them were DeKay's garter, swamp snake and many others. The hunters were very proud of their "bag."



Photograph by courtesy New York Zoological Society.
AFTER A GOOD MEAL

This shows a young king snake that has just eaten two sparrows, shown against the paper, and illustrates the economic value of snakes. During the hunts snakes captured would disgorge recently eaten food. Disgorged mice showed plainly their value right in the field. Such an instance was shown to a farmer who had told a group of hunters to take every blamed snake off the place. His views changed suddenly.

ger of poisonous snake bite. Until a person is able to immediately distinguish and name a snake, and know whether it is dangerous or not, that person has no right to kill any snake. Every time a snake is killed more damage is being done than good. I will not go into detail regarding the very interesting life histories of snakes, facts it will repay anyone to investigate, but will briefly mention the Reptile Study Society and the work it is trying to perform.

Founded a number of years ago by Allen Samuel Williams, scientist, author and lecturer, and now organized in many states, the Reptile Study Society is actively pushing an educational campaign to save the snakes. Practically all the leading zoologists are members, and the roster includes the names of many women. Juveniles form the class to which the most urgent appeal is being made. Hundreds of youngsters are being reached through the Y. M. C. A. and Scout organizations and the like. Energies are directed to correcting false popular beliefs.

Field meetings and hunts have been found the best medium. The boys, expertly guided and carefully watched, catch their own specimens. Fear is overcome by handling and explanation; proper catching methods are illustrated. Dangerous snakes are exhibited and studied; the treatment for poison bites is demonstrated. The boys are not allowed to handle these snakes and are warned regarding them.

The catching and handling brings a psychological condition, heroics, into the scheme and helps to make every boy a protector of snakes. The captured specimens are exhibited and many people are reached through them. This may not appear as a large field for service, but the good being done is surprising.

The Ditmars Club—boys of the Newark, N. J., Y. M. C. A.—has been very active. Two hunts, both well

attended and successful, held before May 15, netted many specimens, and the exhibit is attracting much attention.

A snake hunt, to phrase it mildly, is exhilarating. Quite naturally the sighted snakes resent capture and provide thrills a plenty. Hands and forked sticks do most of the catching. Often, indeed, are the hunters bitten—just scratches that hardly break the skin, clean and painless—but these seem to have a paradoxical effect; they diminish rather than increase fear.

The boys have taken to snake hunting like ducks to water; but they do not hunt—they ransack. A swamp is approached and half surrounded with cold-blooded efficiency, then it is combed from end to end; in squads with a leader they spread out and nothing alive escapes. No regiment could attack trenches with more vim and determination than the youngsters bestow upon old stumps and rotting logs. Literally no stone is left unturned. And a glance backward at the country hunted gives evidence of the battle waged.

Up to their knees in mud and ooze they will collar a banded swamp snake, *Natrix fasciata sipedon*, as long as themselves and bring it in; swimming avails the reptile nothing; on a sunny upland they will race a blue racer, blacksnake; it will have no chance to find a hole—a tail in sight means a snake in bag every shot. Even the evil-looking and bad-acting hognose, the stubby, slow-moving snake that hisses loudly and flattens out when disturbed, the much-feared but altogether harmless “adder,” the bluffer of the snake kingdom, is shown no consideration—merely and unceremoniously bagged, hisses and all. It is characteristic of boys to do anything as hard as it can be done.

Milk snakes, several varieties of garter snakes, ribbon and De Kay’s snakes have all been captured by New York and New Jersey members. The value of these snakes is very distinctly, though a little unhappily, demonstrated. Our hunts took place in early spring, but a short time after the end of the winter hibernation. The snakes were hungry; nearly all that we caught had recently eaten. As is always the case, capturing or handling a snake shortly after it has eaten will cause it to disgorge any food it may have taken. Numbers of our specimens, even while talks were being given on the subject, disgorged the partly digested bodies of small rodents.

Indirectly in this way several farmers were “shown.” They would ask us what we were looking for on their land. Our reply would give us “the run of the place. Take every bloomin’ critter y’ see.” We took the trouble to talk and illustrate the value of the snake to these men and in every case their ideas immediately changed. In one instance the man finally replied, smiling: “Well, if that’s the case, guess I want all my snakes and I’ll have to ask you gentlemen to move on.” And another in our presence called his five sons from the house and told them to give the snakes a chance.

The older and more experienced herpetologists have brought in copperheads, *Ancistrodon contortrix*, and

timber rattlers, *Crotalus horridus*. About every specie of snake in this section is represented in one or more of the society’s collections. Turtles, frogs, toads and a rather complete collection of local salamanders, including a round dozen species, are also in the exhibits. Many snakes not found nearby are also in the collections, pine and king snakes, green snakes and boas.

All of these private collections are interesting; one contains the ugliest snake, another a sort of misfit, a swamp snake with rusty skin instead of the usual dark, faintly marked back; a five-foot snake caught by a four-foot boy, and so on. The value of these collections is great; they not only give their owners certain responsibility, but are talked about and widely viewed.

To visitors the boys enjoy “showing off,” so, indirectly, taking the fear from other people; they “dare” visitors to handle a snake and, when once acquainted, the dislike and repugnance disappear. To the writer it is always a source of wonder to see how quickly the snake wins friends. My own fear vanished in five minutes. It would seem that unjustified prejudice accounts for the snake’s unpopularity.

The most interesting of these private collections is owned by George Von Buehren, who lives at an apartment on Southern Boulevard, New York City. All the serpents found in this section of the United States are represented. He lives alone with them and no mother’s proud young hopeful could be in better condition or have more painstaking care. Many of the specimens he has had for years; many he has reared from eggs or seen born. All are very tame and a few seem to show slight intelligence. At present he has 30 odd specimens, including a young, perfect boa.

ANTS IN GARDENS



ARDENERS who are worried about ants in their gardens may be interested in the statement that ants in gardens do not as a rule cause as much injury as their numbers would indicate. They feed only to a very limited extent on growing vegetables. Many of them feed on the honeydew secreted by plant lice and their presence is often an indication that the plants are infested with these insects.

In case it is found that the ants are actually injuring the plants many of them may be killed by injecting into their nests kerosene, gasoline or carbon bisulphide. In the case of small nests the liquid may be applied with a small oilcan. About an ounce should be injected into each opening. In larger nests the opening may be enlarged with a sharp stick and a greater quantity of the liquid used. After the liquid has been placed in the ants’ burrow the opening should be closed with earth and packed down with the foot. In case of large ant hills it will add to the effectiveness of the treatment if an old rug or wet gunny sacks are placed over the hill to hold in the fumes. Some of the ants may escape and start new colonies. It is therefore usually necessary to go over the garden several times and treat new nests when they become noticeable.

FORESTRY AND THE WAR

From An Address By President Charles Lathrop Pack, of The American Forestry Association,
At the Lake Placid Forestry Meeting, September 6, 1917



It is an unusual pleasure to be the guest of the New York Forestry Association and other representative institutions here today in beautiful Lake Placid. I bring you all the greetings of the directors of the American Forestry Association—an Association of constructive interest in fundamental and progressive forestry with members in every state and territory of the Union, an Association whose membership has doubled even in wartime.

We stand for all that is best in forestry. We wish the New York State Forestry Association and the others here represented God-speed in the splendid work you have in hand. We foresters and lumbermen have an important work to do in war time. The forests of America are increasing in direct and potential economic value and importance on account of war. Now that we are building hundreds of wooden ships, everyone thinks of the larger part lumber is to play in winning the war. There are many other war uses for wood. Take the matter of so-called "naval stores"—tar, pitch, resin and turpentine. These products are essential to every navy and are particularly needful to a wooden merchant fleet. More than two-thirds of the world's supply of these things come from our southern pine forests. We have been wont to refer to turpentine and resin as "naval stores," but now resin is employed in great quantities in filling the space between the bullets in shrapnel shells, so that when shells explode the missiles will be evenly distributed in every direction.

We have sent many portable sawmills and their equipment and crews of trained men to our Allies to aid in overcoming the great shortage of lumber for nearly every war use. The peculiar style of warfare which the great war has brought forth necessitates the use of enormous quantities of timber for trench walls, for trench floors, for braces, shoring, and stays. Millions and millions of feet are required for building behind the fighting lines, for temporary hospitals, for housing non-combatants, for temporary storehouses, for railroad building. Enormous quantities of forest products go into mine props, bridges and for other military preparations. In all this, I have not mentioned what is in all your minds; the great amount of lumber used in building the cantonments and camps and storehouses used in connection with the army training in this country.

As some of you know, sometime since the War Department announced the organization of a regiment of forest engineers composed largely of forestry officers and hardy men accustomed to the ways of lumbering. Now we are told that there will be six of these regiments instead of only one. Some of the leaders of this great force are already in France, prominent among whom are Major Henry S. Graves, Chief of the United States Forest Service, and Major William B. Greeley, also of the Forest Service. We are told that other experts will also be commissioned to go forward with these new commands to France. Their work will be largely in the forests of France, providing all sorts of lumber and wood for the activi-

ties of our army at the front. While organized on military lines, the work of these regiments will be more largely industrial than combatant.

For one thing it has been announced that the American engineer forces with the army in France will have to construct a railroad from Bordeaux all the way to the fighting front to better facilitate the transportation of our troops and to better keep them supplied with all the necessities of war. The building of such a railroad in so short a time would even a few years ago have been considered a great engineering feat. Today it passes as only an incident of a colossal war.


A Committee of the Council of National Defense sometime since estimated that two billion feet of lumber from our forests would be used for purposes directly connected with the war during the year beginning June 1st last. This amount, it is evident, will be exceeded because of the new war necessities for the use of wood. It is now announced for one thing that a large amount of spruce, largely from the western coast, will be used in the construction of a great aeroplane fleet, the greatest fleet of the kind that has ever been constructed in so short a time. It is now thought that the war consumption of American lumber is likely to reach two billion, two hundred and fifty million feet for the twelve months. These new uses and the increased old uses for the products of the forests increase the economic value of the forests and add to the importance of all the questions you are here to consider.

I have an announcement that I want to make which will have, I hope, not only the approval of your minds but of your hearts also. The American Forestry Association, in view of the fact that the majority of those in the forestry regiments going to Europe are trained foresters, lumbermen and woodsmen, has decided to establish the American Forestry Tobacco Fund to provide them and the men of the sawmill contingents with such comforts in the way of tobacco and other things as they may require. My friends, the fact is we are going to do our duty in this hour of trial. This is as much our war as it is the war of England and France and Italy and we all want to do our part. I hope you will join with us in promoting the American Forestry Tobacco Fund that we may give some little satisfaction and comfort to those who are particularly fighting for us in France. We will all be glad of an opportunity to help look out for our own. Contributions should be sent to the American Forestry Tobacco Fund, Washington, D. C.

That we are going to win this war none of us doubts. To do this we must bend our every effort and utilize our every resource. Our timber is essential but our food is just as important. Every individual can help in fighting with food as well as with men and munitions. The production and conservation of food is within the reach of all of us. Former Ambassador Gerard has told us that we cannot starve Germany. Our common sense tells us that we must not starve our army or our allies. We are fighting for national existence and the perpetuation of Democracy.

THE BLUE MESA FOREST FIRE

BY HENRY L. SPENCER, Forest Ranger

 HE season opened hot and dry on Blue Mesa. For thirty days no rain had fallen. The large expanse of Engelmann spruce, with its dense floor cover of down timber and underbrush, was thoroughly dried and awaited but a carelessly thrown match or cigarette stub to start the worst fire that had ever occurred in the Blue country.

Blue Mesa, in Gunnison County, Colorado, embraces the territory between Big Blue Creek on the west, and the Lake Fork on the east; and from the Black Canon of the Gunnison on the north to the north boundary of the Uncompahgre National Forest on the south; a stretch of country ten miles in width east and west, and fifteen miles in length. The upper half of the Mesa reaches up the easy north slope to the Uncompahgre Forest. This fine body of timber, unmarred by axe and saw, lies principally on the public domain, below the National Forest boundary, and contains about 200,000,000 feet, board measure. This timber is particularly susceptible to fires because of the large number of sheep outfits passing through it, and because it lies entirely outside of a National Forest and has no fire protection.

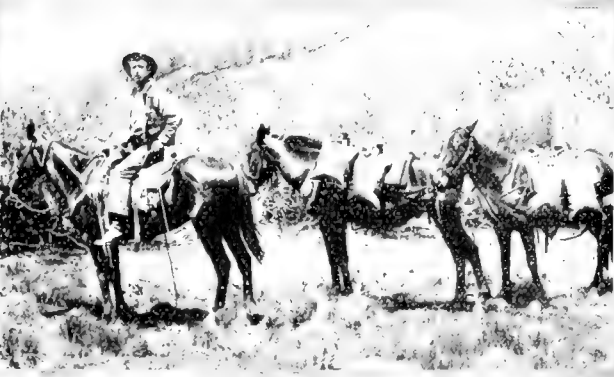
While on a trip over my district, on June 21, I received telephone word from Bill Doran, fire guard at my station, that there was a big forest fire below the Forest boundary, between the Little Cimarron and the Big Blue. Telephone messages came from other sources at the same time and all indicated that the fire was serious, and traveling rapidly toward the Forest. Enlisting Frank Carpenter, who had carried the news to Doran, I arranged to have the Alpine and Bally tool caches, a camp outfit and a supply of food packed to the fire that evening. Ranger Wagner, who had been my fire guard for three previous years, telephoned me that three automobile loads of men would be ready to start from Ridgeway by the time he could reach there from Jackson. I told him to get the men and come on, and I planned to pick up the first-aid crew from the lower Lake Fork and have a follow-up crew come in from Lake City and vicinity the next day. Arranging to have Tony Baker provide six horses at the J-J ranch the next morning, I started from Lake City in an automobile with a chauffeur. As our car rolled out of the town and around the shoulder of a mountain our eyes caught the huge cloud of boiling smoke from the fire. It was 20 miles away, as the crow flies, yet it seemed to be just over the brow of the Mesa.

On the hurried trip we gathered up all the men we could find at their homes and camps. During the night we abruptly topped a ridge, to see the red glow,

toward which we had been traveling, suddenly give way to the countless bright lights of the fire itself. The first impression of such a sight is one never to be forgotten. Close your eyes and imagine thousands of brightly burning camp-fires set in the vast, black background of an inky night, and you will gain a faint idea of the wonderful panorama before us. Over a thousand feet of steep hillside, down to Little Blue Creek, which had checked the fire after its first furious rush, then up the slope on the other side and on south for an unknown distance glowed the myriads of bright lights. No conception of the area of the fire could be gotten other than that it was very large. My sense of the beautiful was dispelled by the thought of the morrow, and the days to follow, when the fire would awaken to the prevailing high day winds and do its utmost to level the Blue Mesa forests.

In making our way to the fire we had to bow our heads against the thickening smoke and as we worked onward I could see that if the fire should cross the parks through which we had traveled, and get into the heavy timber on the east, it would be beyond control and probably the greater part of the Blue Mesa forest doomed. Just before daylight we reached the camp of the men brought by Doran and Carpenter and with the first sign of dawn we started for the fight, with arrangements completed by telephone for camp equipment and commissary to be sent us. We were joined by Ranger Taft and Guard Lucas of the Gunnison Forest and Andy Enbom, a sawmill man, who had information concerning the northwest part of the fire area. We had already determined to fight it on the east and south, and their news confirmed our judgment. The wind was rising rapidly and the fire was responding in many places with high crown blazes. It was about seven miles around the outer edge but the weak places were on the east and south sides. During the day the follow-up crew from the Lake Fork arrived, with Ranger Wagner; Borden came from the Gunnison Forest and Sheriff Hanlon of Gunnison County arrived with ten men, camping on the north end. Wagner brought further reinforcements at midnight.

On the second day every effort was needed to combat the sparks that were carried over our lines by the high wind from the west. The situation was intensified as the fire burned closer to the lines and the spark danger grew greater. Within the fire area were many small patches of trees, which on account of topography and slight isolation had not been burned by the first afternoon rush, and as the fire crept into this heavy timber, high crown fires were started which



FIGHTING FOREST FIRE ON BLUE MESA, IN COLORADO

In the picture in the upper left hand corner of this layout is shown the place in which the fire started, and the timber to the south and east, where the fire fighters concentrated their work. The picture in the upper right hand corner shows fire equipment being packed to the scene on horseback. The round picture shows the camp made by the fire fighters. To the right of this is a remarkable view of the fire going up a spruce tree. The fire area contained a vast quantity of Engelmann Spruce and it was in the effort to save this and to prevent the flames from spreading that the fire fighters toiled. The tented scene beneath the round picture shows visitors at the camp of the fire brigade. In the picture in the lower left hand corner of the page is illustrated one phase of the strenuous work required in checking the progress of a fire in the mountain forests. The bags slung over the backs of the horses are filled with water, which has to be carried for a long distance for use in putting out fires in smouldering trunks and stumps. In the lower right hand picture is shown the floor of the forest after the flames had passed. The fire was a serious one and came near to dooming the greater portion of the Blue Mesa forest.


scattered sparks at an alarming rate. Sparks repeatedly jumped 600 yards across a deep canon to heavy timber. It was absolutely necessary to extinguish these sparks within a few minutes, since an unmanageable fire would result from one of them in a short time. About 3 o'clock in the afternoon the situation became so serious, during the burning of a heavy patch of big timber, that we called out the entire night crew and scattered its members through the heavy forest to the east of our line, patrolling for sparks. Several times we had narrow escapes from the fire getting outside our lines.

The morning of the third day did not develop the danger of the fire jumping our east line that had been present the first two days, and by noon it seemed that the worst hazard on this line had passed. The high wind was now coming more from the north. In the afternoon on a trip around the north and west sides of the fire area I found a heavy patch of 300 acres of Engelmann saw timber located between the fire and the rim of the Middle Blue. The fire had just eaten into the timber, perhaps an hour before I rode up, but was in the crowns and beyond reach by direct attack. Quick action was necessary. I rode through the burned area to camp, quickly got together a crew and returned with them. The thing which astonished and alarmed us was that the fire was traveling north in the face of the wind almost as fast as a horse could walk. The bulk of the timber lay to the north and it was this that we wished to save. A favorable place, where the heavy spruce gave way to a narrow strip of aspen running west, was selected and we began work. Our water bag was emptied in a short time, and as every man was needed on the line, Mrs. Patton, the wife of a sheepman, volunteered to go for water.

Taking two water bags on her saddle she quickly rode three-quarters of a mile to a creek and returned with them full of water. We had men in camp who were much more afraid of venturing around and through the fire than this woman. We finished our line to the rim by sundown.

The next morning arrangements were made to move a camp with full equipment to the west side near the work. Ranger Taft returned to this location with us, and at his suggestion we decided to run a permanent control line up the hill through the heavy timber along the edge of the fire to "corral" it. The "corralling" of this part of the fire was perhaps the most spectacular work done on the job. Carpenter had departed at sun-up to get a gang of Swede timber cutters at Enbom's sawmill. They arrived at noon with a good skid team, five men and Mr. Enbom. By night, under Ranger Taft's direction, the line was well up the hill through the heavy timber. The situation on the east side still demanded the attention of most of our men and no attempt was made to continue the west side control line during the night. The work was resumed early the next morning by Taft and the Swedes. The wind rose with the sun and veered completely around to the southeast, and it was necessary to keep a constant watch for spark fires over the line. By great effort and remarkable endurance Enbom and his men outran the fire to the bare rim of the Middle Blue by a narrow margin. We had it "corralled," but with the wind from the south it was mighty liable to jump out any time. It did jump in several places, but was promptly caught each time, and after the fire had burned up to our control line and burned down, the Blue Mesa fire was under control.

FIGHTING THE PINE BLISTER DISEASE

 HE results of scouting this year have shown that the pure blister disease is generally scattered throughout New England. In some localities currant and gooseberry infections are few and far between, but in the vicinity of pine infection centers they are heavily infected. In Maine and New Hampshire reports of 90 per cent infection of currants and gooseberries were made for several localities as early as the latter part of June. Many new infected areas of native white pines have also been discovered and the disease has reappeared at practically all of the points where diseased pines were found in 1916. Among the important centers of native pine infection found this year are Intervale and Conway, New Hampshire; Bath, Maine; South Royalston, Vermont; Bridgewater and Topsfield, Massachusetts, and Pomfret, Connecticut. The disease has been found on large and small trees; no white pines have been found to be immune, regardless of size or age. At Stratham, New Hampshire, more than 600 separate in-

fections on twigs and branches were found on a tree about 3½ feet in diameter, 50 or 60 feet high.

About 400 men are engaged in blister disease work in New England. The work consists mainly of eradication of currants and gooseberries. Scouting in localities where the disease was not abundant last year is also being done to a certain extent and private owners of pine timber, as far as possible, are being educated in the means necessary to make their pine timber safe. Each state has selected one or more areas of varying size from which all currants and gooseberries, wild and cultivated, are being removed. These areas represent different environmental conditions, some having diseased pine, others none; some with an abundance of wild currants and gooseberries, others where these are scarce. All of these areas, however, have good white pine growth and by eradicating all the currants and gooseberries they can be made safe for the growing of pine.

The eradication crews are trying out different schemes

in order to find the cheapest and most efficient method of work. Each eradication crew must endeavor to improve its methods of work in every way possible. At present the general plan of work of the crews is as follows: The men are lined up 6 to 10 feet apart, and proceed back and forth over the strip of territory to be covered. The end man acts as guide and keeps the line straight. Tags, whitewash, paint, compass and breaking the underbrush are a few of the methods which have been tried by different crews to keep a line through the woods. Thus far the compass has been found to be by far the best and cheapest method where practical.

The tendency is for the members of the crew to work too far apart. For example, in one small swamp a crew working unsystematically reported finding about 100 wild currants and gooseberries. On going over the area in close formation the crew reported finding approximately 500 bushels additional. Most efficient results are obtained when the crew foreman acts as inspector and checks up the work of the crew all of the time. This statement carries no reflection on the efficiency of the individual members of the crew. Apparently most poor work is simply the result of an unsystematic attempt to cover the ground rapidly and thus reduce the cost per acre.

Messrs. Stoddard and Moss of Connecticut have found by experiment that the best and easiest way to pull firmly rooted currants and gooseberries is as follows: One man pull straight upward; another man takes hold near the base of the plant and pulls at right angles to man number one. They claim this method makes the work quite easy and efficient.

In some states county agricultural agents have become interested in the blister disease and their aid has been of great value in assisting scouts in their work. They have also been of material assistance in arousing public interest. The aid of such organizations should be obtained whenever possible.

Massachusetts is taking a census of currants and gooseberries in each town. Work is also being started on a map to show the distribution of pine and currants and gooseberries in all of the Eastern States. The following classifications are being used:

1. White pine comprising half of stand or more
2. Scattered white pine of commercial value.
3. White pine present but of negligible value.
4. Commercial Currant growing areas.
4. Commercial growing areas.
5. Wild currants and gooseberries numerous.
6. Wild currants and gooseberries few.
7. Areas where skunk currants are found.

In co-operation with Ontario all currants and gooseberries on strips one and one-half miles wide along each side of the Niagara river have been eradicated by New York State to prevent the spread of the disease into New York State from Ontario. West of Connecticut

and Massachusetts another strip about two miles wide was eradicated in 1916 to prevent the spread from the above mentioned states. This strip was gone over again this year to remove any remaining currants and gooseberries. Early in August several new currant and gooseberry infections were reported north and south of the terminating points of this line, but no infections have yet been found directly west of the line.

A general infection of considerable extent was discovered last year in the northeastern section of New York. Results of recent scouting outside of this area have shown that the disease is distributed from Lake Champlain well into the eastern portion of the Adirondack region. The line of western extension of the disease, as located by scouting to date, runs through Constable, North Bangor, Malone, Bloomingdale and Saranac Lake. Franklin county; and Lake Pleasant, Hamilton county. Infected currants and gooseberries have also been found at Chestertown, Weaverton and Warrensburg, Warren county; in the best white pine section of the state.

A previously unreported plantation of imported pine, from the Heins nursery, Germany, may explain the wide distribution of the disease in northern New York. This planting was made in 1903 or 1904 at Hurricane, Essex county, New York, not far from the locality where numerous diseased native pines were found last year and this year. This area of scattered native pine infection covers a number of square miles between Lewis and Cross, Essex county, and has been selected to demonstrate the practicability of controlling the disease. Eradication crews have removed cultivated currants and gooseberries and are now pulling up the great grandfathers of all wild gooseberry bushes. About fifty men are engaged in blister rust work in New York State.

Scouting is in progress in other parts of the State and a few isolated infections of planted pines have been found. Currants and gooseberries are eradicated in and around diseased plantations for a distance of approximately one-half mile. Near Geneva, New York, diseased pines were found in a plantation made in 1905 from stock purchased from a large nursery in Illinois. Currants and gooseberries were eradicated around this plantation last summer and very early this spring the plantation was scouted with extreme care and all diseased or suspicious trees were removed. The results have been very gratifying, as frequent inspections have been made and no currants and gooseberries outside of the control area so far have been found to be infected.

Diseased pines have been found in four places in Pennsylvania, but in each instance they were removed before the fungus had fruited. No diseased currants and gooseberries have been reported to date.

Scouting is in progress in New Jersey, but only one infection has been found. This was in a private nursery where the disease appeared last year. Hitherto New Jersey has been considered as being practically free from wild currants and gooseberries, but recently they have

been found rather abundantly in the northwestern part of the state.

Two specimens of diseased pine have been reported from a nursery located at Cuyahoga Falls, Ohio.

Scouting in Maryland, Virginia, West Virginia, North Carolina, South Carolina and Georgia has thus far revealed no blister disease. Planted pines in these states are not abundant, but scouting has revealed a larger number of plantings and a greater abundance of wild currants and gooseberries than was previously suspected.

The blister disease has been found on imported pine in a nursery at Pontiac, Michigan. These trees came from France in 1910 and all shipments from this nursery are being traced. A force of eight men are engaged in general scouting under the direction of Dr. Pennington, of Syracuse University.

A few currant and gooseberry infections found close together near St. Croix, Wisconsin, have been reported, but the source of this infection has not yet been discovered on pine. A force of 24 men are scouting the state.

More than a dozen infections have been found in the St. Croix valley, in Minnesota, scattered over a territory approximately 60 miles long and 10 miles wide. Several native pine trees and many currants and gooseberries were found diseased. Infections appear to be spotted over the valley and an attempt is being made to eradicate the disease on both pine and currants and gooseberries. Pine stock shipped from nurseries has been traced and several of these shipments were found to be diseased. Twenty-six men are engaged in scouting and eradication.

One tree on an estate located at Estelline, South Dakota, has been found diseased. The tree came from an infected Minnesota nursery in 1911 and illustrates the danger of spreading the disease through shipments of nursery stock.

Blister rust scouting is now carried on in Iowa, Illinois, Indiana, Missouri, Kentucky, Tennessee, Nebraska, Kansas and North Dakota, in co-operation with the various state authorities. Thus far this year no disease has been discovered in any of these states, although numerous plantings of pine have been found and examined.

Survey work in the Rocky Mountain and Pacific Coast States having native five-leaved pines has thus far revealed no evidence of the presence of the white pine blister disease. The rumor that the blister disease was found in the State of Washington is apparently unfounded.

A fungus having somewhat similar appearance to the white pine blister disease was found in Kansas in 1892 and in Colorado in 1897 and later. Inoculations by members of this office have practically proved that the rust on currants and gooseberries in Colorado is not the white pine blister disease.

Specific appropriations for the control of the white pine blister disease have been made as follows:

Massachusetts, \$50,000, for 1 year; New Hampshire, \$28,000, for 2 years; Vermont, \$20,000, for 2

years; Maine, \$10,000, for 2 years; Connecticut, \$20,000, for 2 years; Rhode Island, \$2,500, for 1 year; New York, \$25,000, for 1 year; Pennsylvania, \$10,000, for 1 year; Wisconsin, \$15,000, for 2 years; Minnesota, \$15,000, for 2 years.

The Federal Government appropriated \$300,000 for the fiscal years 1917 and 1918, \$150,000 of which is being expended on a dollar for dollar basis in the various states which have made appropriations for this work.

The present outlook for controlling the disease seems to center entirely on whether or not wild currants and gooseberries can be completely and economically removed and whether owners of cultivated currants and gooseberries prefer to lose their bushes rather than the pine. Professor E. G. Cheyney, Dean of the Minnesota Forest School, is engaged in a study of the eradication problem from every angle. He has suggested that in each demonstration control area data be secured this year for providing accurate information in the future on the effectiveness of control and the rate of progress of the disease outside of control areas. A rough topographic map will be made showing the distribution of pine by age classes, also showing type of area for currant and gooseberry growth, such as swamp, open meadow, brush land, pine woods, hardwood forests, etc. In the control area the record of these plants by species and amount of infection will be made, for each type, on permanent sample plots 50 feet square. Outside of the area several lines radiating from the control area will be run for some distance to provide check plots for determining the rate of advance of the disease.

NEW HAMPSHIRE CONFERENCE



UNDER the joint auspices of the Society for Protection of New Hampshire Forests and the New Hampshire State Forestry Commission, the eighth annual state forestry conference was held September 4 and 5 at Dartmouth College. The program included addresses by Governor Henry W. Keyes, Professor Filibert Roth, director of the forest school of the University of Michigan; Professor J. W. Tuomey, president of the Connecticut Forestry Association; Harris A. Reynolds, secretary of the Massachusetts Forestry Association; Allen Hollis, president of the Society for Protection of New Hampshire Forests; Dr. Charles H. Bolser, Professor F. A. Updyke, Professor James W. Goldthwait and Professor A. H. Chivers, all of Dartmouth; Elwood Wilson, forester of the Laurentide Paper Company; Dr. H. H. York, professor of botany at Brown University; S. L. DeCarteret, manager of the Timberlands Mutual Fire Insurance Company; Karl Woodward, professor of forestry at New Hampshire State College; F. H. Tucker, president of the Appalachian club; Mrs. A. H. Harriman, president of the state federation of women's clubs; E. E. Woodbury, Allen Chamberlain, Winthrop Packard and Frederick W. Kilbourne.

WESTERN QUAILS BEING EXTERMINATED

BY DR. R. W. SHUFELDT, C.M.Z.S.

(Illustrations from Life by the Author)

HERE is no better evidence of the approaching extermination of any wild bird in nature, in any country, than the increase of the price demanded for it by ornithological collectors from year to year, when the skins of any species are offered for sale to museums, taxidermists and others. In 1830 the Great Auks were being cut up by the hundreds for bait by the fishermen, who frequented the fishing banks about the mouth of the St. Lawrence river; to-day, a single skin of that bird probably could not be purchased for a less sum than one thousand dollars. When Alex-

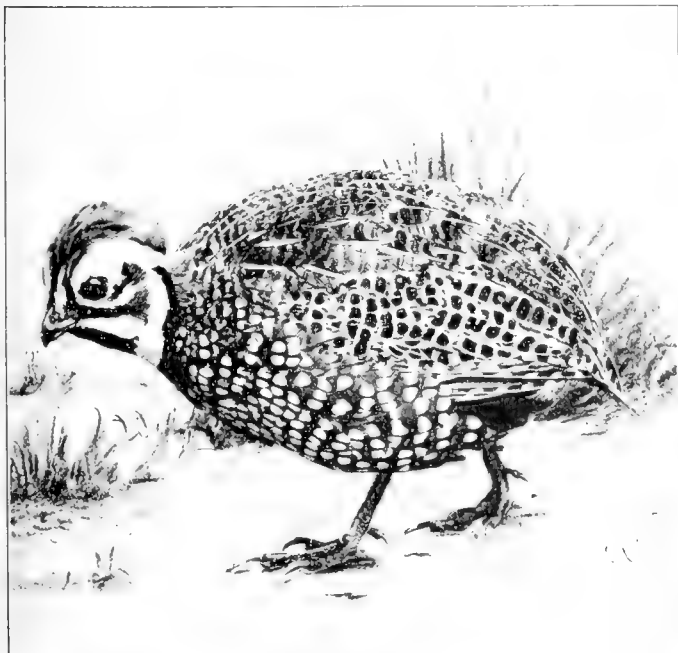
ander Wilson wrote his American Ornithology, the Carolina Parroquet occurred in nearly every State east of the Mississippi, and its skin could be bought for a trifle; whereas now, as the result of eternal persecution and wanton slaughter, this species exists only in certain restricted sections of Florida, and its skin cannot be purchased for less than ten or fifteen dollars. In a few years it will bring double that amount.

These two well-known examples are very fair ones as to what is going on along such lines all over the world, and other cases of it may be seen with respect to the Wild



THE PLUMED QUAIL

This handsome bird is found in Oregon, California and Western Nevada. It is a slaty-gray bird, overtinted with olive brown. It has black and olive feathers on the sides and is otherwise charmingly colored.



THE MEARN'S' QUAIL

This remarkable species is found chiefly in Arizona. The male here shown is spotted and barred with black and white, while other areas are in various shades of tawny and brown.



THE CALIFORNIA QUAIL

This bird is one of the most beautiful of all western quails. It is found generally in Oregon and California and also to some extent in Colorado.



MALE TEXAS BOB WHITE

This bird is the western quail which most closely resembles our eastern species. It is found no further westward than the southeastern corner of New Mexico.

Passenger Pigeon and the Labrador or Pied Duck, described in the February (1917) issue of *AMERICAN FORESTRY*, where figures of both species are presented.

More or less suddenly it will be observed that a certain species, or several species of birds are becoming less and less abundant every year, be the cause what it may—known or unknown. Museums and collectors then get busy, and the very movement put on foot to satisfy the demands of such sources materially increases the danger of the extinction of the species sought.

This critical stage seems to now have been reached in the case of all the beautiful species of quails found throughout the Pacific Coast region. I can well remember when, fifty years ago, those returning from that region, in the early days of California, reported the presence of several of the species here shown in the illustrations in vast bevvies, often numbering several thousand each, such hosts occurring wherever the nature of the country suited them. At the time to which reference is made, millions of these birds were to be found in California alone, and they were equally abundant in adjacent regions. But the gunners and hunters got after them in ever-increasing numbers, with constantly improved weapons, until the usual result was brought about; so that, at the present time, the various forms being considered are, with ever-increasing rapidity, confronted with the same fate that man had in store for the Wild Passenger Pigeon and the Great Auk. Already the prices for the skins of these several species are being advanced in the market for museums and collectors; and this, as pointed out above, is a very ominous sign for these most beautiful members of their kind in any part of the world.

There is but one remedy for this very undesirable state of affairs: to pass laws against the shooting, trapping or otherwise destroying any of these species for a long period of years.

Of course, sportsmen will protest vigorously against any such legislation; but the only way to save the quails of the Pacific Coast is to stop shooting them. The birds in mind are all generically represented in this article. Our Bob-whites do not extend so far to the westward. To be sure, the Masked Bob-white occurs on the southern border of Arizona; but the bird that most closely resembles our eastern species is the Texas Bob-white, and that form is found no farther westward than the southeastern corner of New Mexico.

In so far as our own avifauna is concerned, there are, beside the Bob-whites, four entirely distinct genera of these western quails, and each genus contains, in addition to its type species, from one to three subspecies, there being about nine forms in all. In a brief article like the present one, it will be quite out of the question to give the descriptions, much less the ranges, where all of these truly beautiful birds are to be found at this writing; their photographs must stand for their appearances, and their habitats are not essential; the main object of this article being a plea to save them from certain and utter extermination.

Apart from Mearns' Quail I have had living specimens of all these birds in my possession for the purposes of photography, while the figure of the first-mentioned species was made from a mounted specimen in the collection of the United States National Museum.



THE BLUE QUAIL

This bird is also called the Chestnut-bellied Scaled Quail. It has a noticeably slaty blue plumage.

CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY.
CANADIAN SOCIETY OF
FOREST ENGINEERS

There has been a serious depletion of the ranks of professional foresters during the past month, Millar, of the University of Toronto, and Benedict and Lafon, of the British Columbia Forest Service, having joined American Forestry Units going overseas. D. P. Brown, manager of the mills of The Brown Corporation at LaTuque, has gone to Scotland with a Forestry Unit, and his cousin, S. Brown, is going to Plattsburg to train.

Dr. B. E. Fernow and Clyde Leavitt spent a few days visiting Dr. Howe's Camp and discussing the work which it is doing in the investigation of cut-over pulpwood lands. They also visited the nurseries and plantations and some of the experimental lumbering operations of the Laurentide Co., Ltd., at Grand' Mere, and then went on to visit the Quebec Government Nurseries at Berthierville and the plantations on drifting sands at Lachute, both under the direction of Mr. G. C. Piche, Chief Forester of Quebec. Dr. Fernow remarked that the conditions in the lower part of the St. Maurice Valley were practically identical with those in the western Adirondacks.

On July 31st a meeting of the Quebec Forest Protective Association was held in Quebec, at which all the Fire Protective Associations were represented. Matters of general interest were discussed and a conference was had with Mr. Hall, the Chief of the Quebec Government Fire Service. A committee was appointed to see the Minister of Lands and Forests to urge him to make it obligatory for gum-pickers, berry-pickers, hunters and fishermen, not members of licensed clubs, and prospectors to obtain permits from the district fire rangers before going into the woods. The Minister was also asked to scrutinize more carefully applications for settler's lots, as the high prices for pulpwood were beginning to encourage speculators.

Mr. Avila Bedard, Assistant Chief Forester, is making a tour of the province, giving a series of lectures on forestry and forest protection in co-operation with the Canadian Forestry Association, assisted by Mr. Black, the Secretary. At Grand' Mere they had an audience of about 180 who much enjoyed the lecture and the excellent slides.

A conference was held at Grand' Mere on August 6, between Clyde Leavitt, Forester of the Dominion Conservation Commission, G. C. Piche, Chief Forester of Quebec, Dr. C. D. Howe, in charge of field work for the Conservation Commission, and Ellwood Wilson, to discuss the subject of the investigation of the condition of cut-over pulpwood lands and the best manner of handling them and also the best method of regulating the cut. The



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whole question of a supply of pulpwood for the future is of vital importance to the Provinces of Quebec, Ontario and New Brunswick, and the large increase in consumption makes it necessary to plan for the future. Heretofore and at present the cutting is regulated simply on a diameter limit basis, and this has by no means fulfilled the purpose which was intended. The operators have always gone along on the comfortable assumption that uncut lands were producing so much additional growth each year that enough trees were being left under the diameter limit system to insure a cut for the future and that the supply was practically inexhaustible. The sudden rise in price of wood has compelled them to give a little thought to this matter, and it is hoped that the present study being made will give us a sound basis on which to discuss this question and will lead to the obvious improvements in cutting and handling of timber lands which are necessary. Lumbering practice has not kept pace with mill practice and has not yet availed itself to any very great extent of the discoveries of modern forestry and engineering.

P. Z. Caverhill, in charge of forest surveys in New Brunswick, has resigned to go back to the British Columbia Forest Service and his place has been taken by G. H. Prince. This survey is beginning to open the eyes of the New Brunswick Government and it is hoped they will see the necessity for an up-to-date Forest Service. The stumpage dues of that province have just been largely increased and the lumbermen should demand an efficient management of Crown Timber Lands. New Brunswick should also reorganize its forest protection work and put it on an up-to-date basis.

Arnold Hanssen, for five years with the Laurentide Co., Ltd., after completing his two-years' course for the degree of Master of Forestry at the Yale Forest School, in one year, has enlisted in the Royal Army Medical Corps and is training at the Valcartier Camp.

The figures for the consumption of pulpwood for the year 1916 have just been published by the Dominion Forest Service and show a large increase over 1915. The total consumption for 1915 was 1,405,836 cords valued at \$9,426,217.00, and that for 1916 was 1,764,912 cords valued at \$13,104,458.00. The increase in the year in the price per cord was seventy-one cents. The increase in the consumption has increased in the period from 1908 to 1916 over 265 per cent, and the price per cord during the same period has increased 229 per cent. The increase in consumption if it continues at the same rate will necessitate the most expert handling of the forests in order to insure a supply for the future and the increase in price will be more rapid than it has been owing to the increasing scarcity and inaccessibility of the supplies.

The appointment of men to the outside service of the Dominion Forest Branch continues to be nothing short of a scandal. The District Foresters are compelled to consult the local political boss before making appointments and men are forced on them who are absolutely incompetent and often physically incapacitated. The Canadian Forestry Association made representations to Sir Wilfrid Laurier, when he was Premier, and has twice sent deputations to Sir Robert Borden. Both Premiers promised reforms, but nothing has been done. It is high time that a stop was put to this sort of thing for the good of the country at large. British Columbia has put its Forest Service on a merit basis and its example should be followed by the Dominion Government.

In France German prisoners under their own non-commissioned officers are working at lumbering and enjoying it hugely. They are said not to work very hard. The Canadian bushmen are put on the more technical jobs and superintendence. Much of the lumbering is done by attaching ropes and pulleys to the trunks of the trees and after cutting the roots pulling them over.

PLANTING PECANS

"It has been found that pecans thrive in Mississippi where I live," writes L. B. Fowler, of Shubuta, Miss., "and I am repeatedly asked: Does it pay to use dynamite to plant these trees? I put out 298 pecan trees in February, 1915, using 75 pounds of dynamite which, with caps and fuse, cost me \$15.00. I did not lose a single tree. I have a neighbor that put out 46 trees in the same locality, in the same kind of soil, at the same time. He refused to blast his holes because of the expense. He lost 40 trees out of the 46 and is now replanting, blasting all the holes this time. It cost me thirty cents a tree to set my trees, and it cost him twenty cents each to put his in the ground the first time. As all kinds of explosives have advanced in price the past year, it is costing him about thirty-five cents per tree to replant, thus making his total cost of planting fifty-five cents per tree. In addition, he must count as expense what the trees that died cost him. My trees are all thoroughly rooted by this time, so he is just one year behind me and always will be."

IMPLEMENT BLUE BOOK

The Midland Publishing Co., St. Louis, Mo., has left over a few copies of the 1916 Implement Blue Book, one of which it offers to mail free of charge to any subscriber of this magazine who will send 25 cents to pay the packing, postage, etc. The book has nearly 500 royal octavo pages and contains complete classified descriptive lists of all farming implements, tractors, tractor plows, vehicles, wagons, and kindred goods made in the United States, with names and addresses of manufacturers.

EXTENSION OF LACEY'S ORGANIZATION

WITH the opening of a New York office the firm of James D. Lacey & Company has increased its staff of experts by the addition of E. A. Sterling and C. A. Lyford. Mr. Sterling is in active charge

of the New York office, which is located in the Forty-Second Street building at 30 East Forty-Second Street. He will serve as Eastern manager for the firm. Mr. Lyford has become chief forest engineer and will be located in the Seattle offices, where he will co-operate in field work and in the selling of timber properties.

In thus strengthening its organization

the firm increases its widely known facilities for technical service in properly estimating, mapping and reporting on timber properties. The expansion is in accordance with the firm's long recognition of the necessity for complete and accurate reports as a basis for the financial and operating phases of timber investments. Mr. Lacey has been actively identified with the lumber business for several decades. Of the other members of the firm, Wood Beal has been associated with Mr. Lacey since 1882, and Victor Thrane since 1900. The firm is known to the entire lumber industry throughout North America.

As Eastern manager, Mr. Sterling brings to the firm broad experience, highly developed technical training and splendid ability. He is a graduate of Cornell with the degree of Forest Engineer. His college work was followed by a season of study in Europe, in 1903. After serving as forester with the New York State Forest Commission, he entered what was then the United States Bureau of Forestry. In this bureau and in the succeeding United States Forest Service he had wide opportunity for investigations and experience, covering the entire United States in his extensive travel. After two years of investigation into forest conditions in California he prepared and procured the passage of the first comprehensive forest law enacted in that state. As chief of the division of forest extension in the Forest Service, Mr. Sterling spent two years in administrative work and field travels in connection with the development of the

government policy of reforestation in the National Forests and in giving assistance to private owners along the line of forest extension. For five years, from 1907, Mr. Sterling was chief forester of the Pennsylvania Railroad, in which field his work gained broad recognition.

His next step was to establish himself as consulting forest and timber engineer. As a specialist in wood preservation he gained a national reputation and in 1913 he was elected president of the American Wood Preservers' Association. Recently Mr. Sterling has been manager of the trade extension department



E. A. STERLING



C. A. LYFORD

ment of the National Lumber Manufacturers' Association, where his constructive work was of great value.

To the duties of chief forest engineer Mr. Lyford will bring an experience of several years and an intimate knowledge of forest engineering work. His familiarity with tide-water timber in British Columbia is pre-eminent, besides which he has had broad experience in the pulp region of Eastern Canada. Some idea of the magnitude of his work may be had from the statement that his firm of Clark & Lyford, Limited, has made forest surveys of more than 5,000 square miles of territory, or 3,200,000 acres. Mr. Lyford was in personal charge of much of this work, often spending weeks and months in the commercial forests in order that the survey might be perfected on a high engineering basis. In connection with this work he effected an improvement in survey methods and placed timber estimating for pulp wood properties on a new scientific basis.

Mr. Lyford has been in charge of a British Columbia logging operation for some time. He is a graduate of Cornell University, with the degree of forest engineer. At college he was prominent in athletics, stroking the Cornell "four" and playing football and baseball. With the addition of Mr. Sterling and Mr. Lyford to its staff the firm of James D. Lacey & Company is in position to do even greater work than in the past. Mr. Lacey's home is at Newburgh, New York, and he will make the New York office his eastern headquarters.

CURRENT LITERATURE

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Forestry as a Whole

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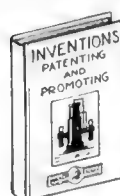
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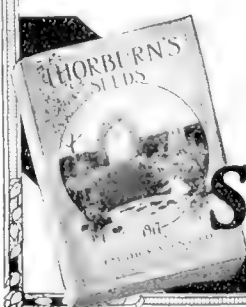
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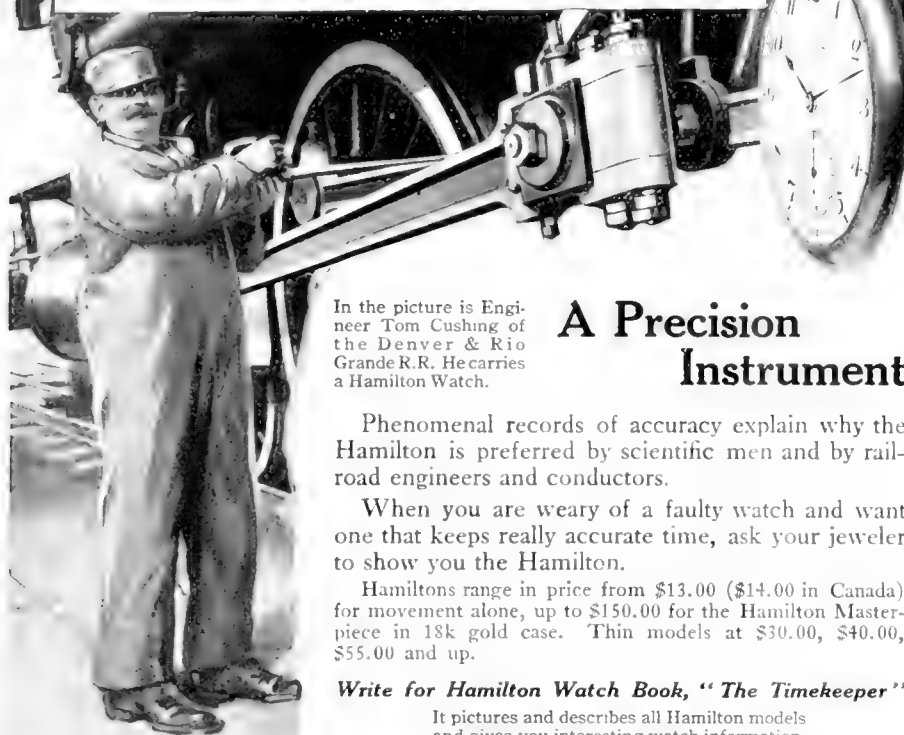
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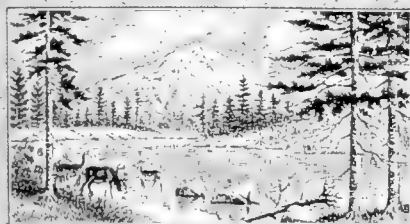
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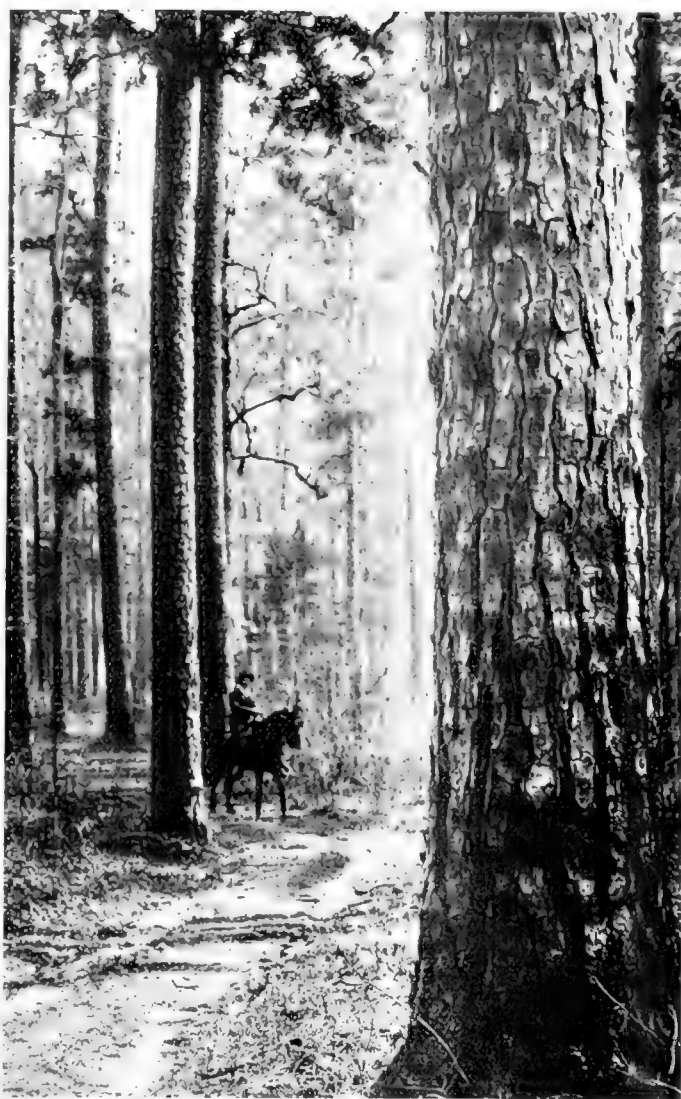
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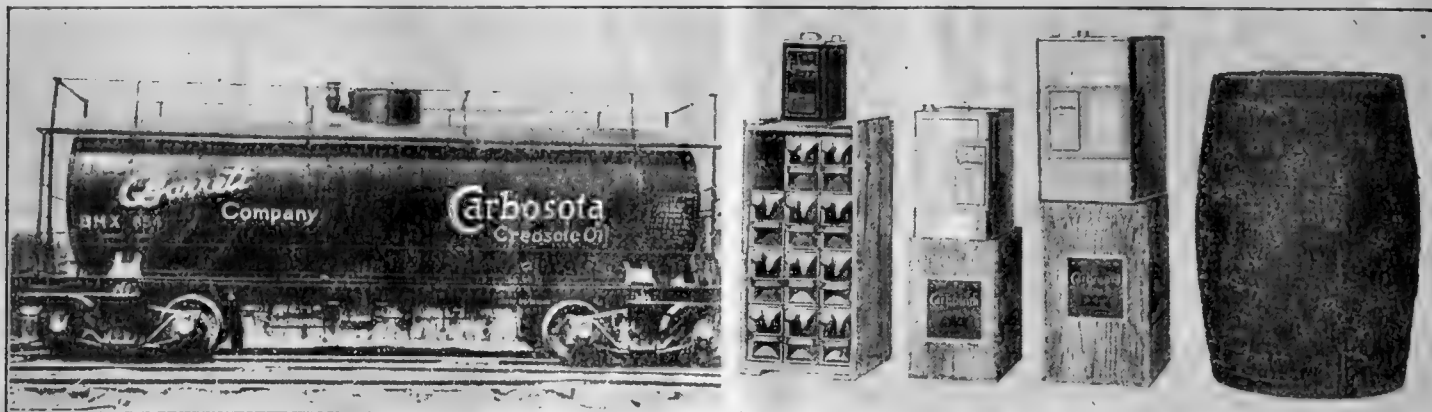
OCTOBER 1917

NUMBER 286

American Forestry



An Illustrated Magazine about Forestry and
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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

OCTOBER 1917 VOL. 23

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The Department of Agriculture has advertised a tract adjacent to the Indian Reservation containing approximately 35,000,000 feet of timber. The Indian timber and the National Forest timber are being advertised at the same time with the understanding that the purchaser of these tracts may log them together. Information as to the National Forest timber may be obtained from the District Forester, Albuquerque, New Mexico. Washington, D. C., August 27, 1917. CATO SELLS, Commissioner of Indian Affairs.

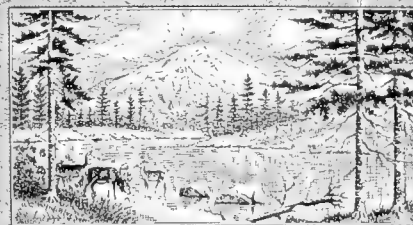
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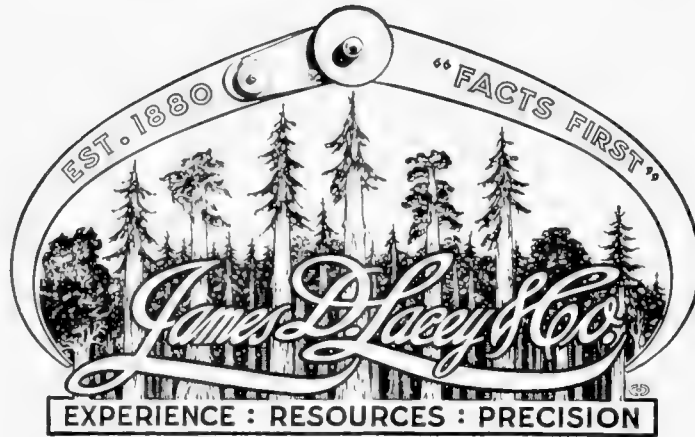
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AMERICAN FORESTRY

VOL. XXIII

OCTOBER 1917

NO. 286

A RELIEF AND COMFORT FUND

WITH the entry of the regiments of foresters, woodsmen and lumbermen into service in the European war zone there arises urgent need for providing definite relief for families of its members requiring assistance while they are on service, or if they are killed or wounded, and for affording field comforts for the men themselves. To meet both phases of this need the American Forestry Relief and Comfort Fund has been organized. Through the operation of this fund it is believed that much can be accomplished in behalf of the men and their dependent families.

That this enterprise will commend itself to the individual membership of the American Forestry Association is certain. Every man and woman interested in the woodland wealth of America will have a direct interest in the men who have gone into the forests of devastated France. A common love for the open places of the great outdoors cements the two classes into a brotherhood of sympathy and understanding. The members of the Tenth Engineers (Forest) are doing a work which appeals to all those to whom it has been given to know the message of the forest. They are doing this work in answer to the urgent call of their country and the vital needs of the allied nations joined with America in the fight for the perpetuation of Democratic institutions. Those of us who remain at home have no duty more imperative than to show them that their patriotism is appreciated and their sacrifices met with adequate response. To achieve this nothing will be so effective as to give them assurance that their loved-ones will not suffer and that their own welfare in the war-zone will be looked after by the people back home.

In sending the Tenth Engineers (Forest) to France the War Department has made only a beginning. Another regiment is now in process of formation and within a short time there will be 9200 men in these organizations in French territory. With the increased number will come increased needs. In order that adequate provision may be made for these needs it is important that the Relief and Comfort Fund shall make headway as rapidly as possible.

The primary purpose of the Fund will be to look to

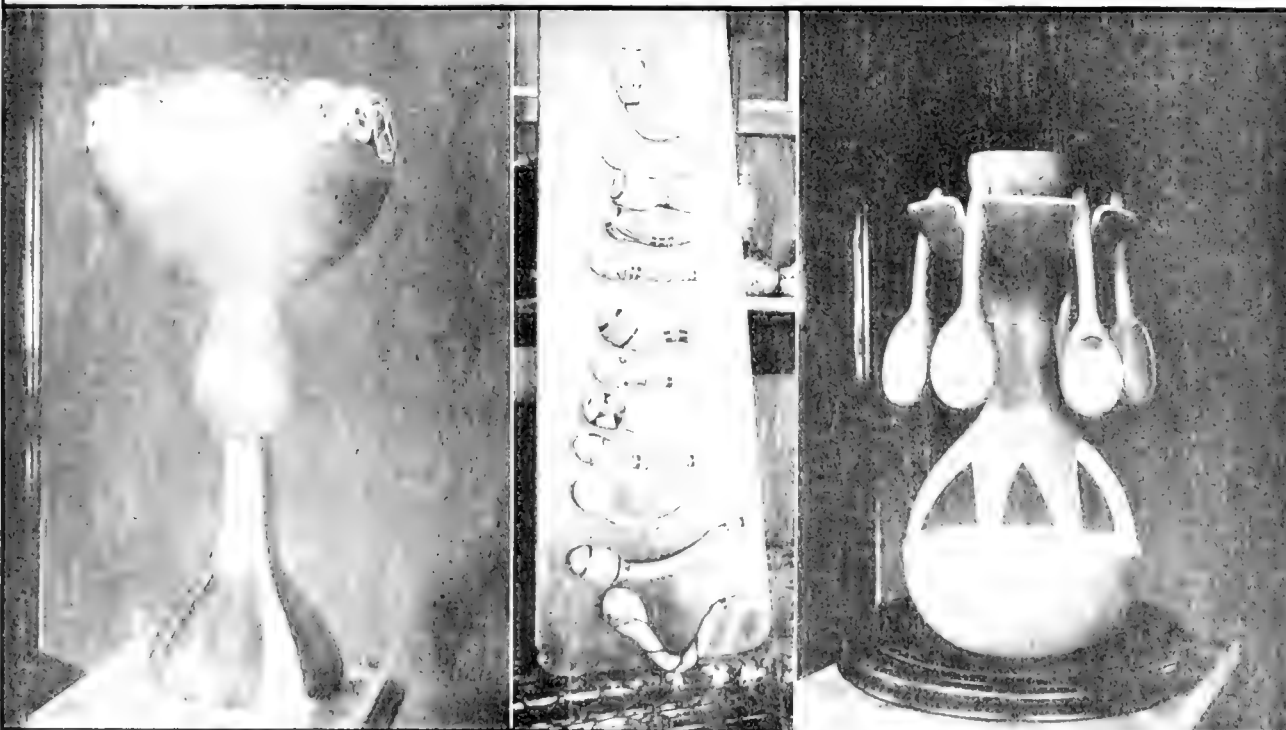
the needs of dependent families. Among the thousands who answer the country's call for forest workers it is inevitable that there should be some who are illy prepared to leave their families properly provided for. The pay of a soldier does not go very far toward meeting the requirements of a household left without its usual means of support. If there be illness or other misfortune the deficit is emphasized. With the haunting fear that his loved ones are not properly cared for the soldier forester will be sadly handicapped in his work. That he should labor under this handicap is manifestly unfair. The people of a grateful nation are under a patriotic obligation to remove this source of worry from the man who has gone to France to contribute his skill and to risk his life in the interests of the cause of freedom. The aim of the fund is to make provision for such dependent families, to assist the man and his household in the event of injury and to provide insurance money in the event of death. In making these things possible the generous people of America will be doing that which is not only a duty but a privilege as well.

The personal comfort and entertainment of the men in France will be another important consideration of the Fund. The man who undertakes the man-sized job of a woodsman needs all the comfort and relaxation he can find. This is true even when he is in his own woods in his own country. When he is taken from his native environment and transplanted to the battle-torn forests of an alien land, among the people of an alien tongue, his needs are vastly multiplied. He will want every form of comfort that can be provided. For relaxation and mental stimulus he will want books and periodicals from home. These things are especially important, as is attested by all army men who have had experience in field and camp. As a panacea for strained nerves and homesickness he will want his pipe and tobacco, through the medium of which to reap peace and contentment otherwise lacking. For his bodily comfort he will need sleeveless sweaters and mufflers with which to protect himself from the chill winds of the French winter. For his recreation he will need phonographs and records with which to beguile the hours of leisure that otherwise would hang heavily on his hands. For these things he will look to the American Forestry Relief and Comfort Fund.



WHAT A WELL-TRAINED GOURD VINE CAN DO WHEN IT TRIES

It is no longer considered necessary for a gourd to grow in the old-fashioned form, which made it chiefly useful as a dipper to accompany the old oaken bucket. A gourd enthusiast has taken the time to produce gourds of various shapes and in proof of his skill he submits this picture of his vineyard. One of his proudest achievements was the production of gourds that were so much like eggs in appearance as to cause visitors extreme consternation when the "eggs" were "accidentally" spilled.



NOT THE PRODUCT OF THE SILVERSMITH, BUT JUST GOURDS

Among the curious developments of the gourd in the vineyard of the enthusiast referred to above is the flower vase shown in the left-hand picture. In the center, mounted on a board, is a display of cigar holders, plucked fresh from this same vineyard. At the right is a bowl, with holders. The grower of these remarkable gourds is J. E. Wilcox, a New York banker, and he insists that any gourd fancier can achieve the same results. The pictures were taken on the Wilcox farm.

WOOD ON THE WING

By BRISTOW ADAMS

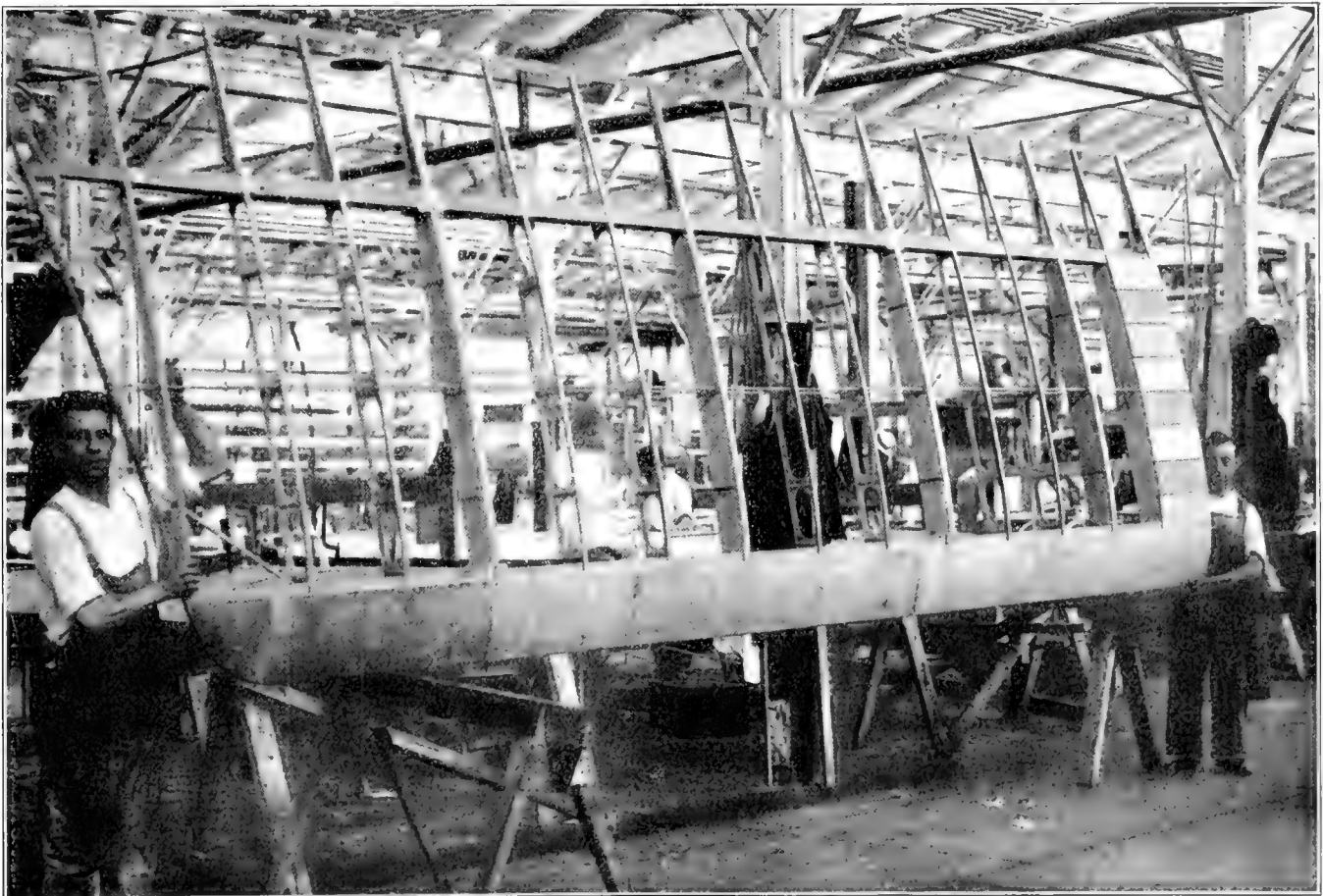
BOMBS from a foreign airplane were employed in a bombardment of the White House on Saturday, September 22, 1917. That the bombs were floral and that the airplane carried the colors of a friendly nation are merely incidental. The important fact is that the bombardment took place and was witnessed by thousands of interested spectators.

On a brisk autumn morning an ivory-tinted airplane gleamed against the bluest sky that ever domed the City of Washington. The sky was essentially Italian, imported especially for the purpose of welcoming the ivory tinted biplane which had been piloted by an Italian flyer from Norfolk to the banks of the Potomac. Thousands of people awaited the arrival of the plane and greeted the visitor with the enthusiasm born of international brotherhood in arms. Hardly had the aviator received the cordial welcome of sky and populace when up from the horizon swept another and larger biplane, silver-gray, to be followed shortly afterwards by the great Italian war-tractor carrying a dozen or more persons.

It was during the flight over the city that the floral bombs were dropped on the Executive Mansion.

Less than ten years before a group of watchers had looked toward the same Southern horizon for the appearance of another biplane. This machine had passed the preliminary tests and was on its final supreme trial before acceptance by the United States Government. The supreme trial was an overland flight from the parade ground at Fort Myer, just across the Potomac from Washington, down to Alexandria—all of seven miles away—and back again to the starting place. As the wind died down with the setting sun, this Wright machine, started by means of the pulley-and-weight launching device, made a few preliminary circlings and then sailed away over the tree-tops out of sight to the South.

The wait for its return seemed interminable; watches were consulted; it had been gone ten minutes. "I'm afraid it won't get back!" said one; "probably couldn't make the turn," said another; "maybe he hit a tree—he was flying rather low." This was the tenor of the com-



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BUILDING AMERICA'S GREAT AIR FLEET FOR USE IN THE WAR

The extent to which wood enters into airplane construction is attracting the attention of foresters and lumbermen. The Government's program calls for the construction of 23,000 airplanes within twelve months. This call for 20,000,000 feet of lumber for propellers alone. For the aviation school cantonments the need is 120,000,000 feet and for coastal airplane stations 22,000,000 feet. This picture shows one of the processes in building the planes in a factory which is turning out large numbers for the Government. It illustrates the construction of the frame of a plane.

ments, with certain optimistic reassurances from others. Then the faint burr of propeller and engine electrified the group of watchers; faint and far a bird-like form showed above the trees, and then swept up fully into view. Was there ever such a thrill? There was no cheering; everybody was holding his breath!

In 1917 it was different. Airplanes were, comparatively speaking, quite common. Washington, between the parade ground at Fort Myer and the flying field at College Park, had become quite *blasé* to flying machines gliding across the city at twilight. Then, too, the aerialists who exhibited their powers at fairs, had added to their repertoires the feat of circling the capitol dome and

looping-the-loop above the apex of the Washington Monument.

But these Italians had something new. They used large planes and did all of the exhibition stunts and a few others besides, including a heart-stopping sidewise fall that might fool even an enemy pilot into believing they had been mortally hit.

"Eyetalians pullin' dat stuff!" was the disparaging remark of a messenger boy who stopped to watch the performance, despite a half-dozen telegrams in his hat. "Don't tell me a bunch o' Wops is gettin' away wid dat box o' tricks. Dem's Americans; we're de only ones dat's got de goods in dat stuff." And he would not be persuaded otherwise. No sir-ree!

But there were the planes, heavier than air, larger than a freight car in outside dimensions, disporting themselves like playful swallows, and doing topsy-turvy tumbling that no sane swallow ever thought of undertaking. Structures of cloth, and wire and wood, supporting heavy engines and passengers, playing in the air with the easy, careless grace of fur-seals in the billows of the sea!

"And wood," says the recurrent and insistent thought of the forester, "is the essence of their construction." History, which does not go far back in this case, says the same thing. Here is the record.

During the years from about 1910 to 1915, the Forest Service made a series of studies of the wood-using industries of the United States, by States. These were made in co-operation with the States themselves, or with organizations within the State boundaries, and the results were published by the co-operating agency, or, in some instances by lumber trade journals.

These reports took up each wood-using industry in alphabetical order, discussed its needs and its value, gave the kinds of woods used and the sources of the raw material. The alphabetical lists usually began with "agricultural implements" or "automobiles," and ended with "umbrella



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AT WORK ON THE FRAME FOR A GOVERNMENT AIRPLANE

Great care and precision are required in the building of an airplane. If the plane is to be used in warfare this accuracy of construction involves not merely the life of the aviator, but the safety of an entire army may depend on it if the bird man is engaged in directing the operations of the fighting forces below. This means that every step must be taken with the utmost skill and caution. The delicate construction is apparent.

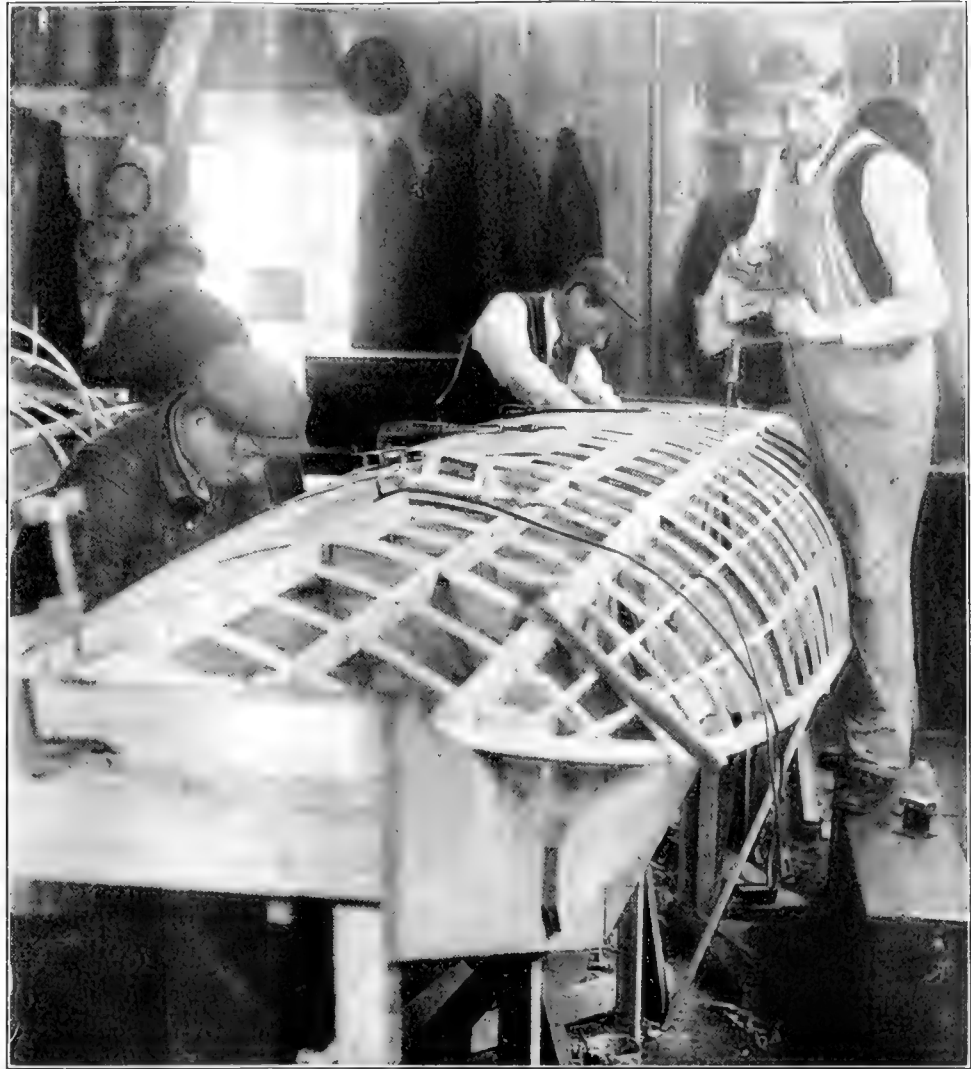
sticks," "vehicles" or "woodenware." In only one that the writer has seen—and he has made a pretty thorough search through them—has there been any mention of airplanes, yet wood is the essential material in their construction. In other words, airplane manufacture, upon which the outcome of the war is said to depend, was scarcely mentioned in this series of government reports issued within the past five years.

The one exception to the general dearth of facts about airplane manufacture was in the report on the wood-using industries of New York, issued in 1913. It listed three manufacturers who made planes or their parts, and gave the quantity of wood used annually as 31,400 board feet, of which spruce furnished about half, the other woods mentioned being ash, yellow poplar, white oak and hickory. The total cost of all woods used was less than \$1,000.00, to be exact, \$968.

Compare these figures of four years ago with the present plans for 7,500,000 feet of oak, and from 40,000,000 to 100,000,000 board feet of spruce.

It is difficult to state authoritatively just how much lumber is going into airplane construction, because authorities disagree. One statement which has official sanction is about as follows: "The war is going to be won in the air. The program calls for the construction of more than 20,000 airplanes within twelve months." Since then it has been stated that the estimates have been revised—and it has been a revision upwards. In another statement it is pointed out that "each propeller uses 300 feet of lumber, and if 23,000 airplanes are built as proposed, and two propellers are held in reserve for each machine, it will take 20,000,000 board feet for the propellers alone." This corresponds to the 7,500,000 feet of oak for the supplying of the blades actually needed for initial construction, without allowing for reserve propellers. The government now is using, according to another authority, some 3,500,000 feet of lumber for airplanes themselves, and 120,000,000 feet for aviation school cantonments with an additional 22,000,000 for coastal airplane stations.

Spruce stands first in the kinds of wood demanded in airplane construction. Practically all of the framework



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WOOD IN THE WING OF A WAR AIRPLANE

Spruce stands first in the kinds of wood demanded in airplane construction. Practically all of the construction is of built-up or laminated wood. One advantage of this construction is that the lamination divides the stresses and prevents them from coming in full force on any one grain. Another advantage is that the laminated stock can be built to form curves or can be bent to curves without splitting or weakening the piece. This picture shows men at work making a wing for a Government war plane.

is of spruce and it bids fair to hold its place, with a possible supplementing by bamboo. Metal tubing has been tried, but has not given satisfaction.

The essential qualities of airplane woods include straightness of grain, strength and lightness, and absolute freedom from defects. The "struts" or upright posts used in biplanes and triplanes are of spruce, as are the supporting ribs in the planes themselves, and the beams, running lengthwise. In these, in particular, the grain must be straight, and must continue the whole length of the piece without going across from one side to the other, or without "running out."

Practically all of the construction is of built-up or laminated wood, in which thin layers are glued together to form the part needed. That is, each post, beam, or rib is made up of thin strips glued together. Except for tacks used in covering the wing frames no nails are used, because they make weak spots where they are driven.

The laminated construction has many advantages. In the first place, the smaller the pieces of wood that are



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FASHIONING A PROPELLER FOR A WAR SHIP OF THE AIR.

The speed of a propeller's revolutions make heavy demands on their strength. Some idea of this strain is afforded by the statement that some engines run at 1700 revolutions a minute and can be geared up to 2000. An engine of this power would use a nine and one-half foot propeller and the speed of the blade ends would be approximately 600 miles an hour. Such speed subjects the blade to pressure of a good many thousand pounds to the square inch and propellers are apt to split at the center and fly apart unless made of perfect material and with great care.

used the more likely are they to be free from defects. Further, the lamination divides the stresses and prevents them from coming in full force on any one grain. It is, on the whole, another exemplification of the adage that in union there is strength. Still another advantage comes from the fact that the laminated stock can be built to form curves, or can be bent to a curve without splitting or weakening the piece. The planes are curved from front to back, and the ribs upon which they are stretched form the basis of this curve.

The main reason for the use of spruce is its uniformity of structure and freedom from defects. Other woods have desirable mechanical properties, but



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FEW NAILS ARE PERMITTED IN AIRPLANES

Nails are not a great deal used in the building of airplanes. Each post, beam or rib is made up of thin layers glued together. Nails weaken the structure. One part of the construction in which nails or tacks are used is in covering the wing frames, as pictured herewith. This must be done with the utmost care and requires the employment of men of skill and intelligence.

lack what might be termed the reliability of spruce. Upon the wood's reliability the safety of the aviator depends, and in turn this may mean the safety of a whole brigade of men on the ground, whose movements the aviator is directing. In other objects made of wood there can be a slight margin of material which is not quite perfect, and this is recognized in the lumber grading rules; but not so with airplanes.

Spruce has the quality of being what it appears to be on the surface. It does not have hidden defects, and this material frankness makes it a favorite. If one picks out a stick of spruce that looks good—is clear and straight—he may be sure that it is good. Other woods very



Photograph from Underwood & Underwood, New York

WHERE PROPELLERS ARE BUILT IN LARGE QUANTITIES.

This is a picture taken in the propeller department of one of the great airplane plants now devoted to turning out machines for the United States Government. Ash has been preferred for this feature of construction, but the largest single order for propeller-blade material is said to have been for the finest grade of quarter-sawn white oak. Propellers are sometimes made of mahogany or of a combination of mahogany and spruce to alternate layers. Some propellers are made wholly of black walnut, which does not splinter when hit by a projectile. The sponginess of texture that keeps walnut from splintering is one of the chief reasons for the use of this material in rifle stocks.

like spruce in general appearance may look as straight and clear, but will occasionally deceive.

Propellers, like the other parts, are made of built-up pieces. Ash has been preferred; but the largest single order for propeller-blade material is said to have been for the very finest grade of quarter-sawn white oak. Some propellers are made of mahogany, mahogany and spruce in alternate layers, or mahogany and ash. Black walnut has been used in place of mahogany, and some propeller blades are made wholly of black walnut. This is partly because black walnut, hit by projectiles, does not splinter. It has a sponginess of texture which gives it this quality, and furnishes one of the reasons why black walnut is universally in demand for rifle stocks.

The propellers are subjected to other trials than those of gun fire, and their normal action makes heavy demands on their strength. The very speed of their revolutions tends to disrupt them. In a test run with propellers made of wood which had been dried to the lowest possible moisture content, or bone-dry, as they say at the Forest Products Laboratory, the ends of the blades actually exuded sap which was forced out by centrifugal action. In tests, at least, it has been possible to speed the propellers up to such a pitch that the outer end of the blade on an eight-foot propeller travels at the rate of 400 miles an hour.

Some air-machine engines run at 1700 revolutions a minute, and can be geared up to 2000. An engine of this power would use a nine-foot-six-inch propeller, and the speed of the blade ends would be in the neighborhood of 600 miles an hour. A good many thousands of pounds of pressure per square inch are generated by this action

alone, and propellers have been known to split at the center and fly apart. Even the smallest lack of balance between the two blades is very serious, since the pull of one must counterbalance that of the other.

In addition there is the gyroscopic force which tends to keep the blades rotating in the same plane. At high speed this force is hard to overcome, and the cross strains it introduces when there is a change of direction, either up, down, or sidewise, are enormous.

Yet under conditions of modern warfare, when an aviator has to "loop the loop" or plunge, or ascend sharply in maneuvering to bring down, or to escape from, an enemy the machine has to meet and withstand these unusual tests.

Ash is used somewhat in propeller blades, but serves its main purpose for engine beds; maple, birch and cherry have found some place in propeller manufacture; Douglas fir has been used for struts, and while there is a plentiful supply of this wood it does not have all of the required characteristics. Sugar pine has value, but the commercial output is not large enough to make it wholly dependable.

Already the demand for woods is forcing a search for substitutes in place of spruce; of these, Port Orford cedar appears to be the most promising. It is marketed from a comparatively small area in southern Oregon only, and sufficient quantities cannot be gotten out at once. Other substitutes for spruce are eastern white pine and southern white cedar, though it must be admitted that the latter has been suggested because of some of its known advantages and not from actual tests.

The best of the spruces for airplane manufacture is

the western variety, or Sitka spruce. There is more than enough of it, but there is difficulty in getting the very highest grades. The Forest Service estimates that only 13 per cent, approximately, is available for plane construction. Of Port Orford cedar, 10 per cent is about all that can be counted on as good enough for planes; about 8 per cent can be used from the spruce of Virginia and West Virginia, and only about 5 per cent from the smaller trees of Maine. A member of the Curtiss firm is reported to have said that only 167 board feet, on an average, goes into planes from each 1000 board feet; he further estimates that 117,000,000 feet of spruce is needed between now and next July.

The Italians, who have made some of the largest planes, have gone farther into the use of Douglas fir than have the other nations, claiming that it has enough of the required mechanical properties and that its greater weight is no bar in the heavy machines that they are building. Laboratory tests indicate, however, that it may lack somewhat in shock-resisting qualities. A recent contract, reported from Seattle, calls for 25,000,000 feet of Douglas fir for airplane use by Italy.

In the New York report of 1913 the average cost of the woods then used in plane manufacture was about \$30 a thousand board feet, which was high as compared with the costs of wood used in other industries, though some industries far exceeded this cost of raw material; black walnut for fire arms, woods used for sporting goods, and cigar-box woods were more expensive. Some

manufacturers reported special prices as high as \$100 a thousand, a cost exceeded only by the woods used for cigar boxes. At that time, with the smaller machines, the total cost of lumber in an airplane ranged between \$100 and \$150, while the labor cost was between \$800 and \$1000.

Since then, prices have increased enormously. It is said that construction experts of four nations—American, English, French and Italian—have agreed on a price of \$105 a thousand for the grades of Sitka spruce which they have specified as coming up to the excellence demanded. The quantity of wood needed for each plane varies, of course, with the size of the machine; few of the present-day types contain less than 250 feet, and it may take 2000 feet in the rough to furnish this amount. One Washington lumberman is making sure of getting only the straightest of straight-grained stuff by splitting it out of the log instead of sawing it. He gets quality at the expense of considerable waste, just as there has always been enormous waste in riving out choice white oak cooperage stock, or hickory for spokes. But the resultant product is sure to have straightness of grain. There is no place where this is more important than in planes.

There has been an actual dearth of the kind of Sitka spruce that must be had, but the northwestern loggers and mill men, in spite of labor troubles said to have been fomented by our enemies, have begun to catch up with the demand; before long they should be able to keep up



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WHERE FLYING IS LEARNED BY UNCLE SAM'S AVIATORS.

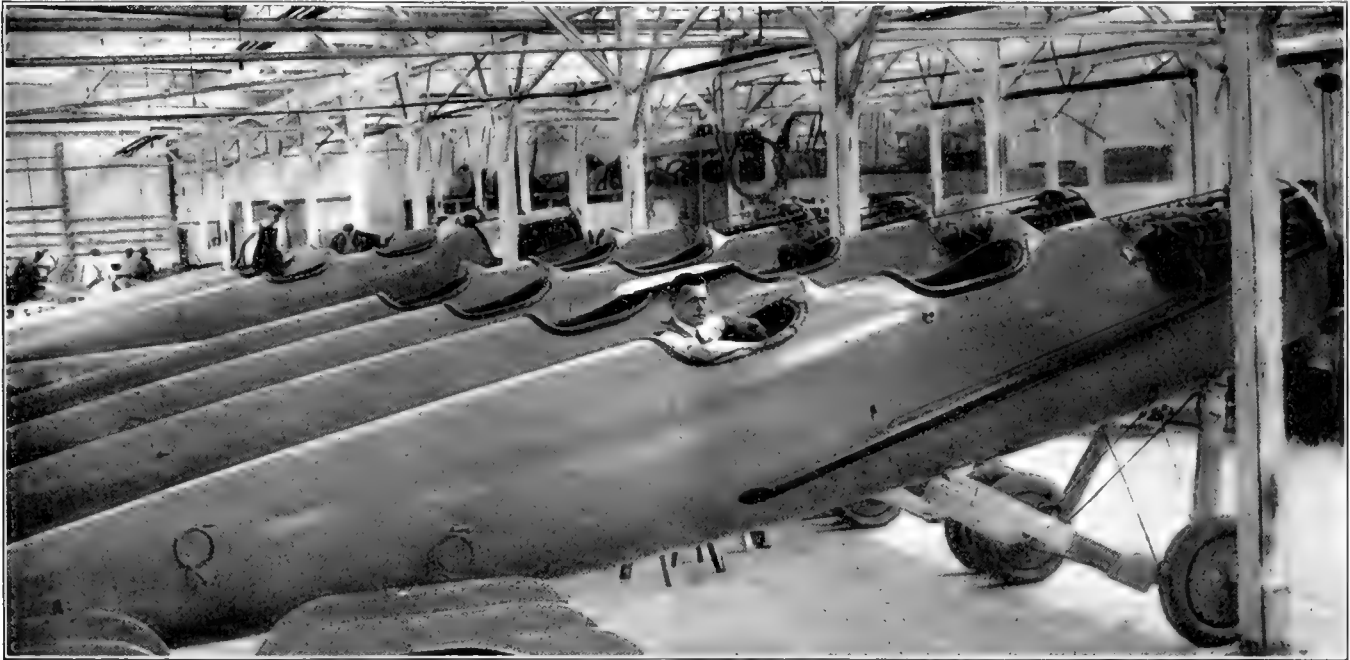
With the constant increase in the army aviation corps comes an increased demand for training school facilities. This picture shows carpenters at work on the construction of hangars for the storing of airplanes at one of the Government schools. Skilled aviators are being turned out rapidly at these camps, to man the thousands of airplanes now being built by the Government. Evidence that aviation is perhaps the most interesting branch of army service during the present war is given by the way the young men of the country are flocking to join the corps. Every camp in the country is being enlarged to take care of these future warriors of the air.

a sufficient and constant supply. In fact, they promise to do so.

The use of wood in airplanes constitutes a new field for this most necessary commodity. It would be surprising to the layman to see the work that is being done all over the country in perfecting this use. The best engineers of the country are busy designing, many of them being gathered in Washington with the Council of National Defense. There is a national advisory committee on aeronautics whose members are performing experiments and plotting curves all day long. Some are specialists on propellers, others on the structure of the planes, to say nothing of all the work that has been done

and as to workability or ease of manipulation in manufacture.

It is currently reported that those who have studied the possibilities of manufacture within the next year agree that Germany can almost keep pace with the combined output of England and of France. Numerically, there will be no marked supremacy in the air on the western front until the United States gets into the game and gives the Allied forces a distinct advantage. For the Allies to win the war, it is generally admitted that the German air forces must be literally smothered, thus putting out the eyes of the Teuton armies. In addition, the war which has long been practically a deadlock in



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SPEED IS SUGGESTED BY THE VERY LOOKS OF THESE BODIES

In this general scene in a manufacturing plant is shown a line-up of airplanes almost finished and ready for delivery to the Government. Each of the long slim bodies shows the seats for observer and pilot. In the lower left-hand corner are rudders painted with the red, white and blue stripes which are the emblem of identification for the American flyers. Each week sees this room emptied by the transfer of the bodies to the final assembling rooms. The factory in which this picture was made turns out scores of machines every month and within a short time the very planes here shown will doubtless be carrying American aviators over the fighting lines in France.

on engines. The research branch of the Forest Service has been busy in this field, and the timber tests conducted at the Forest Products Laboratory have been invaluable. Private firms have had their own experts investigating. If air supremacy does not come out of it, then American inventiveness and ingenuity have at last been stumped.

Back of all there is the insistent thought that the forest resources of the country, serving so well in war in addition to their basic value in peace, are worthy of every effort that can be made to conserve them. They furnish in the case of airplanes, a material for which there is no substitute as to strength in proportion to lightness,

the trenches, must be carried into Germany by the air route, with destruction showered from the skies, ten times as far inland as the range of the biggest guns, upon the great war works at Essen and upon the fleet at Kiel. This is to be an important phase of America's helpfulness in winning the war.

The editorial staff of AMERICAN FORESTRY has made contribution to the aviation corps of the United States Army through the enlistment of Mr. C. W. H. Douglass. With commendable patriotism Mr. Douglass made no attempt to exert the influence at his command toward procuring a commission. He was content to go as an enlisted man and is now with the army in European territory.

C. H. SHATTUCK has left the University of Idaho to become professor of forestry in the University of California. He will pay especial attention to developing the department of grazing and announces a class of 28 students in this subject.

FORESTRY students of the University of Missouri, Department of Agriculture who belong to the Tenth Engineers, Forest Regiment, are C. R. Fritchle and E. B. Hotze, of St. Louis; F. G. Kraft, of Kennett, Missouri, and G. A. Calloway, of Lafayette, Missouri.

FLYING WEDGE OF BANKERS AND FARMERS

An Address Before the American Bankers' Association at Atlantic City, September 24, 1917, by Charles Lathrop Pack, President of the American Forestry Association and the National Emergency Food Garden Commission.

FOOD CONSERVATION is as important and vital as food production. In the work of the National Emergency Food Garden Commission, our Washington offices have concentrated their efforts for the last three months on a nation-wide drive for winter preparedness. We have conducted a campaign of education intended to reach every town and city home in America. How well this has succeeded is shown by the circumstance that our manuals on home canning, home drying, home storage and home pickling of vegetables and fruits have been circulated by millions of copies, in every part of every state in the Union. The daily lessons and helpful hints prepared by our experts on food conservation have been published constantly in nearly two thousand newspapers throughout the country. As a result the Commission feels that the homes of America are acquiring familiarity with the subject of food conservation hitherto unknown, and this familiarity has brought about an unprecedented activity in preparing foodstuffs for winter uses.

This brings us, naturally, to the general question of eliminating the middleman as far as may be possible. The town people who have been gardening and who have been storing away food in their cellars and on their pantry shelves have been striking a telling blow at the prices that have made the cost of living so prohibitive. An economist tells us that the price of garden vegetables has risen only about twenty-two per cent the past year, while the increase in grain and some other products has been several times as great.

Let the bankers and the farmers of America now unite in a flying wedge against the middleman and the food problem will be near solution. The farmer is the best friend the country has, and the more thoroughly we show recognition of this fact the better off we will be. If he is prosperous you bankers and all the rest of us are prosperous. The thing for you to do, for us to do, is to get together—bankers and farmers—and smash the cornerstone of high prices. The man who is carrying the ball in this great home game of supplying food is the town and city farmer, who, as a result of the country-wide campaign of the National Emergency Food Garden Commission and the work of the Department of Agriculture, has planted three million food gardens during the current year—most of them where none were planted before.

The town and city farmer has not merely produced three hundred and fifty million dollars' worth of food F. O. B. the kitchen door. In the football game of food he has tackled Mr. Middleman, thrown him for a loss, and is driving him back from the goal of high prices. Now, with a flying wedge of banker and farmer as a

further help, a touchdown for conservation is certain. Your part, Mr. Banker, is to work with even greater zeal with the farmer. Aid him over the rough spots, so that next year he can produce more foodstuffs than ever before.

We must all wake up to the fact that this country is at war. No one knows when the end will be. This is not a parlor game, nor the annual maneuvers. It is war. If Sherman lived today, he would probably say that war is—supplies. Secretary Baker says that we will have two million five hundred thousand men under arms by spring. Uncle Sam's board bill for his soldiers and sailors will very soon be one million dollars a day. What are you doing—going to do—towards keeping those men fed, that the world may be made safe for Democracy?

Let me give you a quick picture of the food problem as I see it. At breakfast in New York I noticed on the bill-of-fare: "Cantaloupe, half portion, fifty cents." In my morning paper I read what the newspaper boys call a "Page One Freak," which told that a newspaper in Denver was giving away free, with every want advertisement placed in its Sunday edition, a cantaloupe of one of the most famous brands. There you have it. Half cantaloupes fifty cents in New York City, and whole ones nothing in Denver. The metropolis is far from the source of supply. Denver is its center. That tells the whole story.

You do not now have to be told again the need of food F. O. B. the kitchen door. The town and city gardener who can raise even half his winter supply of vegetables is able, as a result, to accomplish much as a constructive citizen, to leave his savings account untouched and to add to it. He can buy a Liberty Bond and he can keep his children in school instead of at work. In other words, we must make a big drive to produce food as near the point of consumption as possible, rout the excessive profits of the middleman, and help the railroads in the tremendous transportation problem that confronts them while the country is at war.

Glass jars and other containers for food must be conserved this winter and their manufacturers must next year be prepared to meet the largest demand for them the country has ever seen. From every section of the United States and Canada comes report that the production of vegetables and fruits suitable for canning will next year far exceed the high-water mark of this year. If twenty-five per cent of war gardeners failed, owing to inexperience, to get a good crop this year, not ten per cent will fail next year. People who did not plant this year have been so impressed with the nation-wide success

of the home-gardening and home-canning movement, that they will not be doing their duty to themselves or to their country if they do not do their share in 1918—and they will do it.

The food problem is one of the vital issues of today. It is a problem from which none of us may escape. Each of us has his individual responsibility in the situation. To win the final victory in the great war, America must feed not only herself and her fighting forces, but she must help to feed the people of England, France, Italy and Russia. To do this with the highest measure of efficiency is the real problem. There must be no lost motion. Every move must be made to count. Every act must be a blow for liberty in our work for Democracy to save and redeem civilization. It is not enough that we should all be alert to the food needs of America and

her Allies; we must back that alertness with constructive skill and real industry.

The necessity for all this is well expressed by Lord Rhondda, the English Food Administrator. He said last week, "I hope the exportable surplus of American primary foodstuffs will be much larger than the present estimates, as the result of food economics by which the United States and Canadian homes are helping to win the war, just as surely as in the production of munitions. Every American woman is in a position to bring nearer the inevitable atonement for the brutal outrages in Belgium, Armenia and Serbia—the sinking of the Lusitania and other horrors, by her day-by-day economies. There need be no fear that the sacrifices will be wasted over here. Unless the Entente Allies are able to import the supplies necessary for the army and the populations, victory may slip from our united grasp."

FIRST APPLE TREE OF THE NORTHWEST

By H. E. Zimmerman

In the Vancouver Barracks, State of Washington, there stands an apple tree of more than ordinary interest. Its history is very interesting and Bancroft, the noted historian, tells the following little incident in regard to it: "At a lunch party in London, about 1825, given in honor of some young gentlemen who were about to embark for Fort Vancouver, in the employ of the Hudson Bay Company, seeds of the fruit eaten were slyly slipped by some young ladies into the waistcoat pockets of the young men, and upon their arrival at their destination the young men, in overhauling their wardrobes, discovered the seeds and gave them to Bruce, the gardener at the fort." Mrs. Mary Whitman, wife of Marcus Whitman, also wrote an interesting history of this tree, September 12, 1836.

It is said that the seeds planted by the gardener, Bruce, produced several trees, three of which lived for a long time, and were pointed out as the only apple trees in the northwest. In the course of time two of them disappeared, leaving the present tree alone. Even the existence of this tree seems to have been almost entirely forgotten by the general public, not even the commander of the Barracks knowing that such a tree stood on the very ground which he controlled. It was largely through the horticultural inspector of this district, Mr. A. A. Quarnberg, that the tree was discovered and identified. In 1911 Mr. Quarnberg wished to have a gavel made of wood from this apple tree for the Washington State Horticultural Society, and, upon examining the same, found it badly infected with San Jose scale, half its branches dead, and in a bad condition generally. On January 13th that year he called upon Col. G. K. McGunnigle, Commander of the Barracks, and got the necessary permit to prune, spray and do anything necessary to preserve the life of the tree. On January 25th, by direction of the Washington State Commissioner of Horticulture, he took measurements—the same year—and found the tree to have the following dimensions: One



A TREE WITH AN INTERESTING HISTORY
It is an apple tree and stands in the Vancouver Barracks in Washington, the sole survivor of several planted about 1825, the seeds having been brought from London.

foot from the ground, 1½ feet in diameter; height, 33 feet, and spread of crown, 33 feet. On February 20-21, this year, the tree was pruned, and all dead branches and brush removed, the rotten wood in the trunk and branches cleaned out and filled with plaster-paris and cement, and all cuts painted. Later it was sprayed and a good coat of manure applied at its roots.

In 1915 the Department of Agriculture at Washington requested Mr. Quarnberg to send them specimen apples for making wax forms.

THE FRIAR, HIS DOG AND THE IRON CROSS

By ALICE SPENCER

WHEN science tackles some of the problems of wood structure the freaks of nature not infrequently have the best of the argument. One of the most difficult things for the scientist to determine is the cause of such peculiarities as are shown in the accompanying illustrations. These freaks are shown with photographic accuracy and have not been retouched or altered in any way.

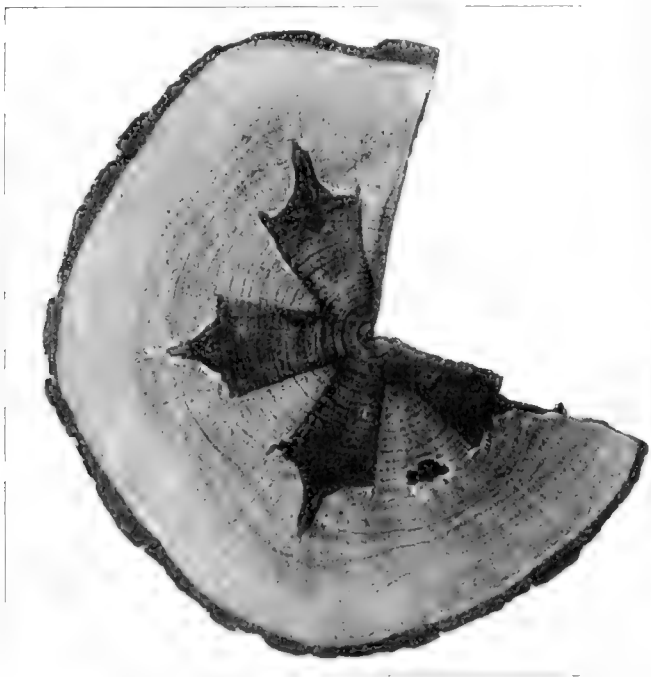
In the first picture is shown a formation found in a poplar board at a Cincinnati upholstery furniture factory. The friar here represented in speaking likeness is considered one of the most interesting freaks of wood structure ever discovered. In the second picture is shown a curiously wrought animal face which might be taken for that of a dog or a hog. For the purpose of classification in a family group it is here chosen to designate it as the Friar's dog. This formation was found in a board cut from a new species of dogwood which was



THE HOODED FRIAR

This freak formation was found in a poplar board and shows the extent to which nature will go in varying the monotony of everyday tree growing.

ing. During its years of growth the tree apparently healed the outer scar by supplying a new covering of bark. This gave the exterior a normal appearance, but left the iron cross in the center for discovery when the trunk should reach a sawmill.



THE IRON CROSS

Perhaps the suspicious will think the discovery of this freak structure indicates that German spies are endeavoring to force American forests to supply iron crosses for military decorations. The suspicion is groundless, recently discovered by Secretary R. S. Kellogg, of the National Lumber Manufacturers' Association.

The singular wood structure shown in the third picture comes from Greenfield, Ohio, and has been the subject of considerable speculation among scientists to whom it has been submitted. The exact cause of the formation has not been determined, but the best opinion seems to be that it resulted from the stripping of the bark of the young tree on four sides. The removal of the bark is supposed to have caused a discoloration which ultimately reached to the very center of the growing trunk, while those portions of the tree where the bark had not been damaged retained their natural color-



THE FRIAR'S DOG

Those who think this animal looks as much like a hog as a dog must remember that the board in which the picture was found was a piece of dogwood. This circumstance should settle all disputes.

SOME ACHIEVEMENTS IN FOOD

BY NORMAN C. McLOUD



BACKWARD look at the growing season of 1917 cannot fail to make one proud that he is an American. Throughout the nation the call to the flag of food production and food conservation met with response genuine and swift. The whole country organized itself into an army of soldiers of the soil and

age has been foiled and famine has been forced to surrender.

The close of the season is a time for stock taking in connection with the food situation. We have had production past all previous records and beyond all expectation. A nation-wide survey undertaken by the National



"THE BIGGEST WAR GARDEN IN THE WEST."

One of the most impressive results of the campaign conducted by the National Emergency Food Garden Commission was the war garden at Inspiration, Arizona. This garden was 3,300 feet above sea level, in the heart of the copper mining district. It covered an area of 217 acres and the double crop system was used to increase the fruitfulness of the land. The needs of the community were considered in planting and 85 per cent of the ground was used for raising Mexican pink beans and sweet corn. Nothing was allowed to go to waste and the Commission's manuals were freely used in encouraging canning and drying activities.

warriors against waste. In the creation of this army no draft was required. Confronted with threatened national food shortage the people of the United States acted with singular spontaneity. Enlistments were voluntary and enthusiastic. Service was energetic and constant. During the early months the symbols of service were the rake and the hoe. With the maturity of the crops these were supplanted by the canner and drier as tokens of the patriotic gift of the people to America at war. Through the combined attacks of the allied forces of producers and preservers food short-

EPIGRAMS ON HOME GARDENING AND FOOD THRIFT

From Literature of the National Emergency Food Garden Commission—Season of 1917.

Provide a Food Supply F. O. B. the Kitchen Door.
Winter Food Supply F. O. B. the Pantry Shelf.
Soldiers of the Soil; Warriors Against Waste.
Every Soldier of the Soil Should Promote Himself to a Colonel of Conservation.
In Its Power Against the Enemy the Can Is as Certain as the Cannon; the Drier as Dauntless as the Dreadnaught.
Can All Food That Can Be Canned.
The Nation Is Fired With the Spirit of a New Freedom.
Food Waste Is the Enemy, Food Thrift the Battlecry and Food Conservation the Weapon.
War's Emergency Has Brought With It a Sense of War's Responsibility.
In Wartime a Nation With a Food Shortage Is a Nation in Peril.
It Is Time to Begin Starving the American Garbage Pail.
Otherwise We Will Begin Starving Our Allies in Europe.
Instead of Empty Tomato Cans the Backyard Now Has Its Crop of Tomatoes. For Unnumbered Tins We Have Substituted Foodstuffs in Unmeasured Tons.
Make Food Thrift Your Wartime Gift.

Emergency Food Garden Commission has located over three million home gardens, most of which were cultivated where no planting had been done before. On this vast area has been raised a food crop valued at \$350,000,000 — equivalent to \$350 of nourishment for each man of the million now under arms in the military and naval establishments of the United States. For this tremendous achievement of production too much credit cannot be given the Food Garden Commission which has worked in affiliation with the Conservation Department of the American Forestry Association.

Through its aggressive and forceful campaign of stimulation America has been thoroughly roused to the need for increasing the food supply as a measure of wartime preparedness. In the same way and by the same methods the people have been inspired to food conservation on a scale never before approached. As a direct result there was never a season that brought to the tables of America such a wealth of health-giving vegetation F. O. B. the kitchen door and never a winter which faced such abundant stores of home-grown and home-prepared food supplies F. O. B. the pantry shelf.

The first duty of this enormous yield of garden stuff, already accomplished, was its tremendous value in keeping down the cost of summer living for the people of America. That household expenses have been bad enough is painfully obvious. That they would have been far worse without this garden crop is equally apparent. Students of economics agree that if the war gardens had not created this increased supply, prices for vegetable products would have been a great deal higher. The average increase in prices for garden stuff has been little more than 20 per cent while the increase in the cost of grain products has been several times as great. This may well be taken as direct evidence of the worth of the home garden movement to the people of the United States.

The significance of this newly discovered planting area does not end with the summer season. The war gardens will exert their influence on the cost of living during the winter months just ahead. Their value is a thing of the future as well as the past. Conservation has been practiced on a national scale. In the homes of America there has been definite recognition of the importance of looking ahead. The individual citizen has realized that the over-supply of the growing season must be translated into terms of abundance for the winter. Food saving and food conserving have been practiced on a national scale. From a wasteful nation America has been remade into a nation alert to the needs of the future. The keynote of this new national spirit has been that nothing should be allowed to go to waste—that nothing useful should be thrown away. How well this spirit has crystallized into

action is shown by the plaintive cry of the garbage collectors throughout the United States. The men who make a business of converting waste into tangible assets are agreed that the new cult of Food Thrift is playing havoc with their profits. I know of one collector who complains that although he covers twice as much territory as he covered a year ago his collections are actually smaller. As a tribute to the American spirit of Food Thrift nothing could be more eloquent.

Of similar importance is the thrift shown by the people of America in achieving winter preparedness. Canning, drying and storage operations have filled cellars,

storerooms and pantry shelves with a tremendous supply of foodstuffs for winter use. It is a conservative estimate that close to half a billion jars of vegetables and fruits have been stowed away as a result of the season's canning operations. To this must be added the stuff prepared by drying, pickling, fermentation and other forms of conservation, and millions of bushels of vegetables stored in their natural state. The whole forms a national asset of tremendous volume.

In bringing about this great movement for production and conservation the National Emergency Food Garden Commission's offices in Washington have been a center of activity second to none of the wartime agencies at the seat of government. The commission's staff of experts and large office force have worked under emergency pressure during the entire season. The manuals prepared and issued



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WINNER OF CANNING PRIZE NO. 1

As a stimulus to home canning the National Emergency Food Garden Commission offered one thousand prizes of \$5 each for home canned vegetables from war-gardens. Miss Helen Tew, of Washington, D. C., was the first winner, receiving check No. 1 and a certificate of merit.

by the organization have been accepted as a notable contribution to the literature of food production and food conservation. Free distribution of the books on home gardening, home canning, home drying, home pickling and home storage has been made to the extent of millions of copies. The aim of the Commission was to place this literature in every home in America. That this aim has been approximated by results is apparent to those in touch with the situation. No channel of distribution has been overlooked. The manuals have been sent through agencies of federal, state, county and city governments, through school officials, through libraries, through councils of defense, through women's clubs and

through every conceivable avenue for reaching the people. In addition to this wholesale distribution the Commission has filled individual orders averaging 25,000 a day, received as a result of a persistent campaign of publicity in 2000 newspapers in the United

States. The aggregate has been staggering, and the demand has taxed the capacity of the largest printing offices in Washington, Baltimore and Philadelphia.

Early in the campaign for canning and drying it developed that the government could not meet the demand for literature on these two subjects. Because of the war emergency the pressure on the government printing office was so heavily increased that there was unavoidable delay in printing for all branches of the public service. In one of the bulletins issued by the Commission it was stated that its Washington offices had received numerous calls from Congressmen asking for help. "One Congressman wanted 30,000 of our manuals," said this bulletin, "because he was swamped with requests and the government printing office, he said, could not fill the demand because of great tax upon it from all departments."

Through all of this activity the serious purpose of the Commission has been given frequent touches of relief by episodes incidental to the day's work. One of the most startling incidents of the campaign was the receipt of a telegram requesting that canning and drying manuals be

NO CAMOUFLAGE OF FOOD

While conceding the value of camouflage for the purpose of deceiving the enemy the National Emergency Food Garden Commission has taken a firm stand against trying to practice camouflage on the human stomach. "You may fool the enemy by masking your batteries and making the battlefield look like a peaceful landscape," says a recent bulletin; "but the stomach of a soldier is not so easily hoodwinked. The soldier must have real food."

sent immediately to Inspiration, Ariz., for use in connection with "the biggest war garden in the West." The Commission's staff includes people from all over the United States, but none had ever heard of Inspiration outside the fields of poetry and the arts. As a

town it had no meaning for any of the staff. Nor could it be located through consultation of maps or postal guides. It was not until inquiry had been made at the Postoffice Department that Inspiration was found, and even then it was learned that the place had to depend on a town two miles away for its mail facilities.

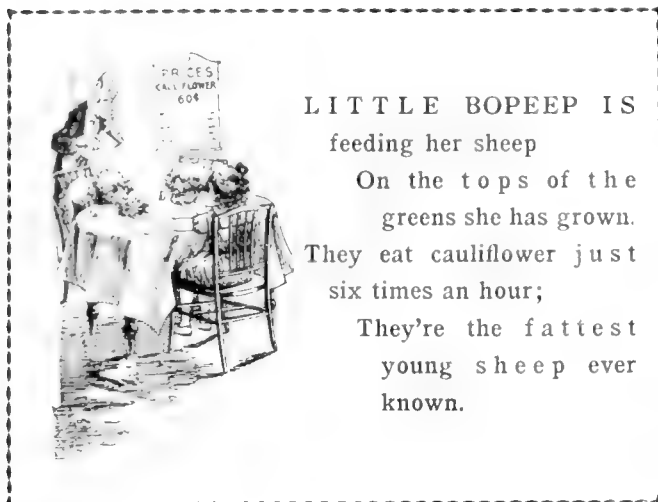
This was a puzzle. That a community which did not even boast a postoffice of its own should claim the biggest war garden, created a new situation and one not lacking in dramatic value. The manuals were forwarded by express without delay and the Commission then set in motion machinery for procuring further information about the big garden in the hidden community of the Southwest. The results were amazing—not to say an inspiration. From J. R. Sandige, the expert in charge, came the following statement of fact:

"The gardens are two miles east of Miami, Gila county, Arizona, at an elevation of 3,300 feet. The climate is semi-tropical, making it possible to grow some vegetables throughout the year. A majority of the gardeners are employes of the Inspiration Consolidated Copper Company, but quite a number of residents of



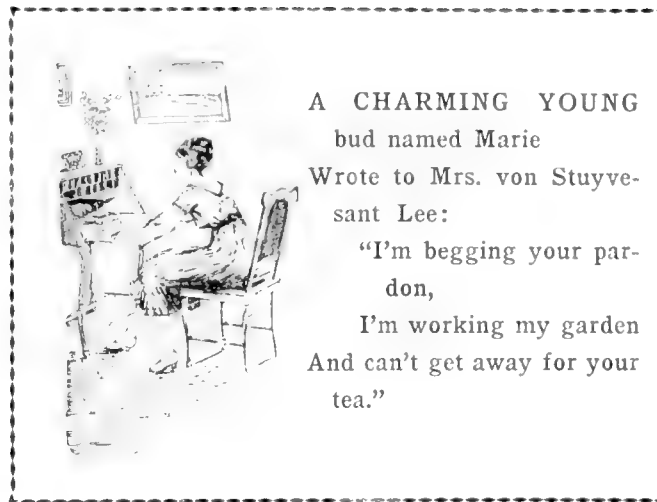
WHERE RACE MEETS RACE IN GARDEN WORK.

Not the least impressive feature of the war garden enterprise at Inspiration, Arizona, was the polyglot character of the workers. Perhaps no other garden in the country was cultivated in as many different languages. The picture gives a comprehensive idea of the diversity of races. Reading from left to right the men represented the following named races or nationalities: Apache Indian, Negro, Hungarian, English, Mexican, Irish, Chilean, Italian, American and Austrian. The gardeners in this big garden were for the most part employes of the Inspiration Consolidated Copper Company and the members of their families.



LITTLE BOPEEP IS
feeding her sheep

On the tops of the
greens she has grown.
They eat cauliflower just
six times an hour;
They're the fattest
young sheep ever
known.



A CHARMING YOUNG
bud named Marie
Wrote to Mrs. von Stuyvesant Lee:

"I'm begging your pardon,
I'm working my garden
And can't get away for your tea."

Miami and a large number of children have been given space. The gardeners are made up of many nationalities, including Italians, Mexicans, Indians, Chileans, Germans, Finlanders and Swedes. Over seventy per cent have never had experience in this work, or at least where it is necessary to irrigate, and they had to be taught.

"The gardens were planned by C. E. Mills, general manager of the company. An expert makes three trips a day over the gardens to instruct the gardeners. Bulletins and posters are placed at convenient spots in the gardens which are 217 acres in area. The double crop system was used. For example, squash were planted among corn so that when corn came off squash covered the ground. We grew most anything but need was considered first and 85 per cent of the ground was planted to Mexican pink beans and sweet corn. Nothing goes to waste and drying and canning is encouraged, especially drying, for our climate permits sun drying.

"We have opened a war garden market where the excess vegetables are sold for the gardeners, without cost to them. Nothing is sold at this market except that which is grown in the war garden. This market, I believe, is the first of its kind in the United States. This is the largest single tract of land devoted to war gardens in the west. With 217 acres under cultivation I believe it is the largest in the country."

Another high spot in the season's activities was the

word which reached the Commission from Laurel, Mississippi. In this southern community practical application was given of the most efficient and reliable methods of conservation and thrift. Some of the moves were the substitution of motor trucks for horses for the sake of saving horse feed and the cutting of wood as a blow to over-reaching coal men. In a letter to the Commission Mayor T. G. McCallum wrote:

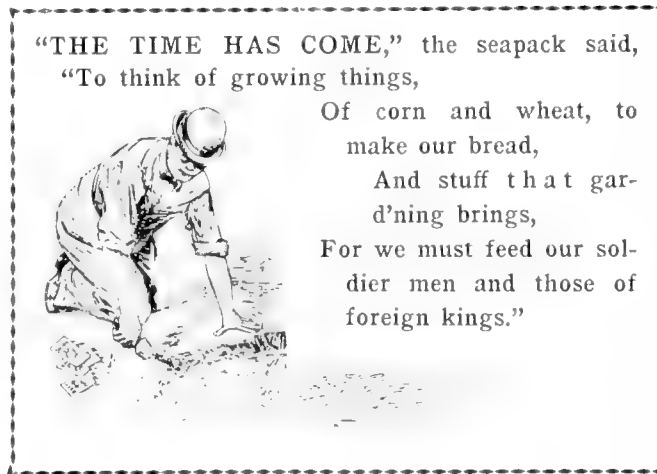
"Immediately upon the entrance of the United States into the war and the Government's appeal to the people to conserve and produce all products we proceeded at once to motorize all departments where motor trucks could be substituted for horses and disposed of the horses to farmers to produce more food as well as to save food by the introduction of the automobile. The next step taken by us was to secure and plant sufficient lands to corn and peas in order to produce enough corn and hay to take care of all the remaining city teams, and while we scarcely had time to do this, war having been declared late in the spring, we are glad to say that the city will make all the corn and pea-vine hay necessary to care for the teams owned and used by the city in the public work.

"As soon as this matter was out of the way we took up the question of fuel for the city schools, city hall, jail and other public buildings, and upon inquiry of the mines or coal dealers, many of them refused to quote us prices on account of the scarcity of cars, and with those



IF OLD Mother Hubbard
should go to the cupboard

She'd find all the food
she'd desire;
For stored away there is
foodstuff to spare,
The product of canner
and dryer.



"THE TIME HAS COME," the seapack said,
"To think of growing things,

Of corn and wheat, to
make our bread,
And stuff that garden
d'ning brings,
For we must feed our soldier
men and those of
foreign kings."

that did, the prices were from 50 per cent to 75 per cent higher than we had formerly paid for similar coal. So we proceeded to cut our own wood and while we are not quite through with the wood cutting proposition we are far enough along with it to know that we will, without great inconvenience, be able to secure all the wood needed for city schools and the city generally and at the same time effect a great saving in the revenue of the city.

From Elyria, Ohio, came tidings that Mrs. Thomas Edwards was believed to be the oldest woman in the United States to raise a war garden. Mrs. Edwards is 94 years of age and her garden was planted and culti-

Through the bureau of education the campaign was carried into the public schools of the nation. In co-operation with School Commissioner P. P. Claxton the Commission sent about 25,000 copies of its manuals on canning and drying to superintendents of public schools and co-operating with Commissioner Cato Sells, of the Indian Office, thousands of copies of its manuals were sent to the Indian schools in various parts of the country. It was felt that a great deal could be accomplished with the aid of the school children just as hundreds of thousands of vegetable gardens had been planted by pupils early in the spring. The bulletins on canning and



PART OF THE INSPIRATION OF INSPIRATION, ARIZONA.

If the gardening season of 1917 has left any person unconvinced of the value of child labor in war gardens the skeptic would do well to make a trip of exploration to Inspiration. The advantage of child labor of this type is that it is as valuable to health as to the cause of food production. Those who think to the contrary are cordially invited to submit pictures showing a healthier band of young people than here shown. Every boy and girl shown in the group worked in the biggest war garden in the West and their rugged health is as eloquent as the pictured crops as to the value of garden work.

vated entirely by herself. Early last spring she sent for the food garden primer issued by the Commission and carefully followed instructions given in this complete manual. Her success attracted national attention.

At East Orange, New Jersey, L. G. Hinsdale, librarian, distributed 5000 manuals on canning and drying to the housewives of the city on Food Registration Day. These manuals were given at the polling places as a helpful contribution to the women in the food conservation work for which they were being registered.

In Chicago the public libraries entered with genuine enthusiasm into the work of stimulating canning and drying operations. In requesting the co-operation of the Commission, Assistant Librarian C. B. Roden wrote that 10,000 manuals would not last a week in the 40 branch libraries in their distribution of the booklets to the housewives of Chicago. Impressed with the spirit shown by the request the Commission sent 20,000 manuals instead of the 10,000 that had been asked for—making the biggest single consignment sent to any library system in the United States.

drying were given to the pupils with instructions that the booklets were to be taken home so that their entire households might be benefited by the helpful information. Advices received in Washington during September and October indicated that these manuals were eagerly used by the school communities and that results of great importance were achieved along the line of food conservation.

Typical of the recognition accorded the Commission's work is this editorial comment from the New York World: "The announcement of Charles Lathrop Pack, president of the National Emergency Food Garden Commission, that housewives this year have canned 400,000,000 jars of fruits and vegetables indicates a very large addition to the nation's food supply. Like the perishable product of the small home gardens, it is not to be measured accurately, but no one can question that the impetus given to individual effort through public agitation has been of immense help. No government census can ever fully cover so wide a field of activity or give exact figures for the total output."

Similar editorial comment appeared in the Chicago Evening Post as follows: "The Department of Agriculture, as we noted recently, omitted from its crop report any estimate of the home gardener's crops. The backyard farmers, however, are not lost sight of by their Uncle Sam. Charles Lathrop Pack, of the National Emergency Food Garden Commission, after a careful survey, reports that there are more than three times as many gardens growing vegetables in the United States today as there were a year ago. The increase represents a gain of one million, one hundred and seventy-five thousand acres, and he estimates the total home garden crop will aggregate \$350,000,000. If you doubt whether the home garden is a real factor in the food situation ask the man who peddles vegetables in your neighborhood."

It has not been alone in the United States that the work has gained recognition. Newspapers and letters have been received from Great Britain, France, Italy, Australia, Hawaii, the Virgin Islands, Cuba, South America and other far away corners of the globe, showing that the Commission's home garden movement has attracted the attention of the press of the entire world. From many of these countries have come requests for the literature issued by the Commission. One such request came from Nigeria, British West Africa. The letter was from D. O. Gundsdlabor, of Opobo, who wrote: "There are signs here of inevitable famine and we are doing all we can to save the situation. This means the storing of food and the best way to preserve it. How can I store and preserve such foods as are common in this section of Africa?"

It is needless to say that the full literature of canning, drying, pickling and storing was sent Mr. Gundsdlabor by the first mail and that the Commission's experts gave him all available additional suggestions that would apply to his particular conditions of climate and products.

One of the whimsical, but impressive, suggestions arising from the campaign was that if the season's home canned jars should be placed in a pyramid with the Washington Monument as a center, the structure would completely hide the towering shaft which dominates the landscape of the National Capital. It was also suggested

that the jars do not have to be collected into a pyramid in order to stand as a monument to American patriotism. Tucked away on pantry shelves from East to West and from North to South they make a fortress of impregnable strength in this crisis which demands all the strength the nation can muster. They are the foundation of America's wartime preparedness. The food thus conserved has a value as vital as the country's armed forces. In the battle for world freedom these household stores are as important as our soldiers; the jars as potent as our blue-jackets and the cans as powerful as the cannon.

Among the constructive activities of the Commission none proved more useful or attracted more widespread attention than the offer of \$5,000 in prizes for home canned vegetables from home gardens. The fund was divided into a thousand prizes of \$5 each, awarded at local fairs and food exhibits throughout the country during September and October. The competition was keen and close observers agreed that no single incident of the food thrift campaign did more to stimulate interest

in home canning than this contest. At state, county and local fairs and at public exhibits of various kinds the prizes were eagerly sought. With the close of this month 1000 home canners from coast to coast will have received the individual rewards in cash, together with certificates issued by the Commission giving permanent record of the holder's success in the competitive enterprise.

While congratulating itself on the results achieved, America is in no position to rest on its oars. This point

THE SLACKERS



I WISH I WERE the license clerk
Who grants the right to wed,
For I'd bring up with vicious jerk
The man who hides his head
Behind the heart of some poor girl
Who little knows the craft
With which he's set her brain awl
That he may dodge the draft.

'Twould do me good to take the chap
And kick him down the stairs.
And thus bestow a needed slap
On these misguided pairs.
I'd make each slacker heed the call
To take a gun and fight
The foe whose cruel deeds appal
All men whose souls are right.



But since I have no license job,
To catch this shameless shirk,
I'll form a little private mob
And do some other work.
'Twill give me joy to slug and swat
The folks who help the foe
By wasting, or by letting rot,
The stuff their gardens grow.

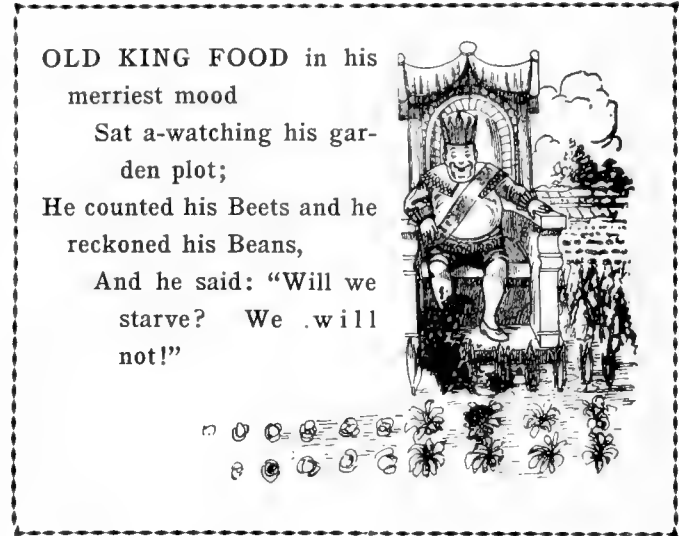
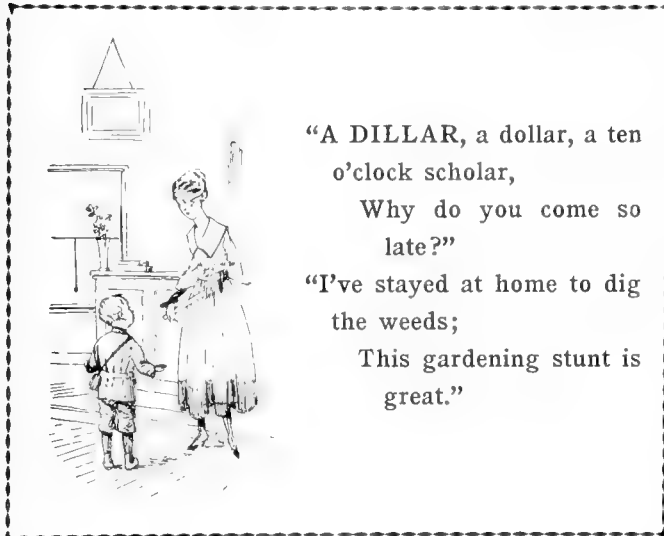
I'll drive them to the garden patch
With patriotic haste,
And make them hustle to the scratch
To stop this sinful waste.
I'll make them get a wiggle on,
And either can or dry
The garden truck, ere summer's gone,
For winter time supply.



There'll be no slackers left alive
If I can have my way;
For I will make a mighty drive
And set them making hay.
The bridegroom slackers, conscience
knows,
Deserve a deadly shaft;
But after all I'm out for those
Who dodge the Food Thrift Draft.

was given emphasis in the early autumn when 125 cattle raisers met in Washington to confer with Secretary of Agriculture Houston and Food Administrator Hoover over the world-wide shortage of meat. These producers were told by the representatives of the federal government that the shortage will continue for several years.

duce in our war gardens. Next year we must do even better. We will then have more war gardens and the average product will be larger. Housewives of this country this year have preserved and canned at least 450,000,000 jars of vegetables and fruits. Next year, profiting by their experience of this year, they will can



With this condition before us the Commission urges every city gardener to look ahead to the coming year of production and conservation.

It is not merely a question of today, but one of tomorrow that we must answer. With the prospect of having close to two million men under arms and the possibility of having to help feed a big part of Europe, we are confronted with the vital need for planning ahead for 1918.

Germany reports that its war gardens produced more this year than any year since the war started. This shows the value of experience. We have had one year's experience and have raised \$350,000,000 worth of pro-

millions more. More will be needed, for too much emphasis cannot be placed on the fact that there will be a greater demand for food exportation next year than there ever has been before. We must fill this demand. To make this possible the home gardeners must augment their forces and increase their labor of patriotism and the soldiers of conservation must extend their activities in canning, drying and otherwise preparing foodstuffs for winter uses. To reap the full benefit this year's experience must be applied to the solution of next year's problems. That the results will then be even greater than those of 1917 is assured and America will win renewed recognition as the most powerful factor in the great war for human rights.

J. DENNY O'NEILL, who recently became state highway commissioner for Pennsylvania, has issued a statement advocating the planting of trees along the roadside throughout the state. He urges that the shadeless roads of the state be transformed into well-shaded avenues, and is particularly strong in his advocacy of fruit trees for this purpose. As especially desirable he suggests ox-heart cherry and the apple tree. For purely shade trees he suggests the sugar maple and red oak. In a letter to the engineers and road superintendents of the various counties he instructs these officials to interest residents along the highways, by appeal through caretakers and foremen on state roads. He names fall arbor day, October 26, as a good time to make a start.

THE ENDURING strength of wood is evidenced in the Fairbanks house in Dedham, Mass., built in 1636, and believed to be the oldest frame house in the United States. The oak timbers were brought from England about 1635. They are still solid.

THE GULF, Mobile & Northern Railroad plans extensive improvements at Mobile, Ala., to cost \$1,000,000. The project includes three new piers and a series of warehouses. The new construction will be especially designed to handle lumber traffic. One pier will be arranged to take care of 2,000,000 feet of sawed lumber, and another will have a capacity of 5,000,000 feet. The plans have been submitted to the War Department, and after approval the railroad company will need a large amount of piling and timbers.

THE Harvard Graduate School of Business Administration in co-operation with the Department of Forestry, announces a course in the lumber business for college graduates who look forward to undertaking some branch of lumbering for a life work, and also to graduates of forestry or engineering schools who desire special instruction in the lumber business. The course covers two years, and upon completion graduates are given a degree of Master in Business Administration.

THE LURE OF THE BEAVER

BY D. LANGE

With Photographs by the Author

BEAVERS have been called animal engineers, and the title is by no means an empty honor. No animal possesses such remarkable constructive ability as the beaver. Even the most sceptical scientist who sees the dams they have constructed, the dome-shaped houses they have built, the canals they have dug, the trees they have felled and the piles of brush and poles they pickle for their winter food will marvel at the intelligence of these furred dwellers of the wilderness, and will secretly wonder, if after all, beavers might not possess a spark of human reason.

The Chippewa Indians believed that the beaver people once did possess both human reason and a human language, but Manitou had to take away from them the power of speech so that they would not become wiser than the Indians themselves.

When North America was discovered, the beavers lived on almost every stream and lake north of Mexico and were an important source of both food and clothing for all the tribes inhabiting the present Northern States and Canada. So numerous and so generally distributed were these animals that the needs of the Indians made no impression on their numbers.

With the increase of trade between America and Europe the beaver became a veritable animal of fate to both Indians and Whites, and within historic times no other animal has played such a fateful part in the suppression of one race and the spread of another and indeed in the conquest of a whole continent by the white race as the American beaver. Beaver wool, the

fine dense fur which protects the beaver from the icy water of his habitat, was found to be the most suitable material in the manufacture of fine hats, and for more than two centuries, until 1825, the European markets were insatiable in their demand for beaver furs. From a very modest beginning the American fur trade rose to world wide proportions and importance. Such in-

trepid explorers, pioneers and traders as Kit Carson, Jim Bridger, George Cartwright, John Jacob Astor, Larpenteur, the two Henrys and unnumbered nameless and forgotten adventurers and explorers who wooed fortune, suffered untold hardship, faced death, and committed dark and bloody crimes as loyal servants of three great rival fur companies, all followed the lure of the beaver. They followed him to the small headwaters of the Mississippi and St. Lawrence and they crossed the divides and followed him down the streams which send their waters to the distant Pacific and to the ice-bound Arctic.

When the Americans had won their liberty in the Revolutionary War, tobacco was no longer used as currency in Old Virginia, but beaver skins were still the standard of value in the country of the upper Great Lakes and in vast regions farther north and west. A few records from the Jesuit Relations and other documents of the eighteenth century are interesting, and the present day reader may even find grains of humor in them. One of the Jesuit Fathers reports that, "in 1656 Monsieur de la Poterie opened a tavern at Three Rivers at which wine was sold to the savages, two pots for a winter



OUR FRIEND THE BEAVER

The clever, sagacious, hard-working animal—the chief engineer of the animal world—not so protected by game laws that the chance of his becoming extinct is growing remote.



Courtesy of the American Museum Journal

YOUNG BEAVERS AT HOME

Part of the new group recently constructed in the American Museum.

beaver and one pot for a summer beaver." Monsieur the Governor of Montreal ordered this tavern closed but the order was not obeyed.

About 1761 the trader, Alexander Henry, spent

who . . . paid greater prices than if a competition had subsisted. A competition on the other hand afflicts the Indians with a variety of evils in a different form.

"The following were the prices of goods at Fort des Prairies:

	Beaver Skins
A gun	20
A stroud blanket	10
A white blanket	8
An axe of one pound weight.....	3
Half a pint of gunpowder.....	1
Ten balls	1

but, the principal profit accrued from the sale of knives, beads, flints, steels, awls and other small articles.

"Tobacco, when sold, fetched one beaver skin per foot of Spencer's twist, and rum, not very strong, two beaver skins per bottle; but a great proportion of these commodities was disposed of in presents.

"The quantity of furs brought into the fort was very great. From twenty to thirty Indians arrived daily, laden with packs of beaver skins."

The meat which Henry refers to was not beaver meat, but dried and smoked buffalo meat. Although beaver meat is good eating and was freely used by both Indians and Whites in the fur country, I have rarely found it mentioned as an article of trade, while the meat of buffalo, deer, elk and moose was a common article of trade. For curing the meat, the beaver was too small an animal.

In places where there was no competition, it is claimed that traders made a profit of 2000%. Father Charles Lemant writes that about 1625 the French Trading Company exported from Quebec 12,000 to 22,000 skins annually. The Company paid 4 1-3 livres



A FAT BEAVER TRAPPED

The trap was placed near the top of his house and he was caught as he was entering it. He has been shipped to the state game farm of Wisconsin and is prospering there now.

some time at Mackinac in the present State of Michigan. From this place, which was for many years an important point in the fur trade, he relates the following incident:

"The Jesuit father killed an ox which he sold by the quarter. He took for the meat the same weight in beaver skins. Beaver skins were worth a dollar a pound. Money is very little used at Mackinac, all trade being carried on in furs. A pound of beaver skins is worth sixty cents in trade."

In 1776 the same trader visited the Assiniboina at Fort des Prairies in the Saskatchewan country, and a few paragraphs from his journal give interesting glimpses of the trade in beaver skins in the far west.

"Four different interests," he writes, "were struggling for the Indian trade of the Saskatchewan, but fortunately they had this year agreed to join their stock, and when the season was over to divide the skins and meat. This arrangement was beneficial to the merchants but not directly to the Indians



BEAVER ON THE DAM

The animal swam down the stream and climbed on top of the dam just as the photographer took the picture. It is exceedingly difficult to get such a photograph in the beaver's native haunts.

in Quebec, and the skins sold in Paris at one pistole apiece, which amounts in our money to a buying price of 85c and a selling price of \$1.00.

A good trapper in a well-stocked country could catch two to three hundred beavers in one season and secure a good deal of other fur at the same time.

Many Indians, becoming temporarily rich beyond their dreams, invested their wealth in all kinds of silver ornaments which they could wear on their persons. Whole Indian villages went annually on a drunken debauch when they had carried the product of their winter's hunt to the traders, for rum was one of the great staples in the Indian trade. Its sale was immensely profitable, and no one trader or company could stop the unspeakable havoc it caused among the Indians; for if one trader had no whisky, or refused to sell it or give it away as presents, the Indians took their peltries to one who would give them plenty of the white man's milk.

It is not surprising that an animal of such commercial importance and remarkable habits as the beaver aroused the interest of travelers and scientists. But as most travelers had neither the time nor the patience to make personal observations on an animal so shy and wary and largely nocturnal in its habits, many absurd stories of its life became current and were accepted by credulous writers and a still more credulous public.

Some of the most interesting glimpses of life and conditions in the beaver country during the height of the fur trade may be gained from the narrative of John Tanner, a white man, who, when a boy eleven years old, was kidnapped by some Shawnee Indians in Boone County, Kentucky. He was sold by his captors to Netnokwa, a Chippewa woman, who adopted him as her own son. He lived amongst the Chippewa from about 1780 to 1830, mostly in the regions now embraced in Northern Minnesota, Ontario, Manitoba, North Dakota and Assiniboia.

Referring to a bear hunt which ended a period of starvation, he relates the following: "The old woman said, 'My son, look in that kettle and you will find a mouthful of beaver which a man gave me since you left us this morning. You must leave half of it for Wamagonabiew (her son) who has not yet returned from hunting, and has eaten nothing today.' I accordingly ate the beaver meat, and when I had finished it, observing an opportunity when she stood by herself, I stepped up to her and whispered in her ear, 'My mother, I have killed a bear.'"

From other remarks of John Tanner one may glean the sad story of the degradation of the Indians as well as the story of the rapid extermination of the beaver.

Netnokwa and her sons had visited an old friend,

Peshauba, in the present province of Assiniboia. The party started in canoes down a tributary of the Assiniboin River with all the furs Peshauba had accumulated during several years of hard labor. They intended to return to their former home on Lake Huron. Of this journey Tanner writes:

"When we came from the Little Saskajawun into the Assiniboin River, we came to the rapids, where was a village of one hundred and fifty lodges of Assiniboins and some Crees. We now began to feel the want of fresh provisions, and determined to stop a day or two to kill sturgeon at this place where we found a plenty of them. . . . In two days from these rapids we came to Mouse River where both the Northwest and the Hudson's Bay Company have trading-houses. Here Peshauba and his friends began to drink, and in a short time expended all the peltries they had made in their long and successful hunt. We sold one hundred beaver skins in one day for liquor. The price was then six beaver skins for a quart of rum, but they put a great deal of water with it. After drinking here for some time, we began to make birch canoes, still intending to continue on our journey."

The journey was never completed. After telling of two years of toilsome wandering back and forth, of hardships and misfortunes, Tanner again strikes the sad refrain which rings through all the stories of the unbounded forests of the Indian and the beaver:

"The old woman, being much dissatisfied at the misconduct of her son, the disappointment of her hopes of returning to Lake Huron, and other misfortunes, began to drink. In the course of a single day she sold one hundred and twenty beaver skins with a large quantity of buffalo robes, dressed and smoked skins and other articles, for rum. It was her habit, whenever she drank, to make drunk all the Indians about her, at least as far as her means would extend. Of all our large load of peltries, the produce of so many days of toil, of so many long and difficult journeys, one blanket and three kegs of rum only remained, besides the poor and almost worn-out clothing on our bodies. I did not, on this or any other occasion, witness the needless and wanton waste of our peltries and other property, with that indifference which the Indians seemed always to feel

"We repaired to Rainy Lake trading house, where we obtained a credit to the amount of one hundred and twenty beaver skins, and thus furnished ourselves with some blankets, clothing and other things necessary for the winter."

For about a hundred years, during the eighteenth century, Canada practically lived on beaver furs. Beaver skins paid for her imports from Europe; in beaver furs the church received its tithes, and in beaver furs the converted Indians paid for the mass which the priest read for the souls of the departed

braves. It is quite fitting that the beaver has been given a place on the national coat-of-arms of Canada.

In the valuable historical documents known as the Jesuit Relations, no animal is so frequently mentioned as the beaver, and the journals of all the early traders and explorers show that from about 1600 to 1825 and even later, the beaver was over a region larger than all western Europe, of as much economic importance to the inhabitants as gold was in the early days of California and as cotton is now in our Southern States.

Under these conditions the slaughter and destruction of the beaver proceeded at a fearful rate. The annual export of beaver skins probably did not much exceed half a million, but it is likely that two millions of the animals were killed every year.

The beaver hunter, like the placer miner, exhausts the source of his wealth in any one locality very soon, and is compelled to move into new regions. Beavers, in spite of their apparent sagacity, are easily caught, and as their size and manner of life make concealment impossible, the beaver population has so rapidly decreased that today there are probably not

more than 500,000 of them alive in the whole of North America, although the original beaver population of the continent must have been at least 50,000,000.

In 1871 the Hudson's Bay Company still furnished 174,461 skins, in 1905 the supply had fallen to 54,119. The total production of beaver skins from 1672 to 1902, largely based on figures of the Hudson's Bay Company, is estimated at 3,000,000 skins, and valued at \$100,000,000.

About 1825 the Hudson's Bay Company absorbed the Northwest Company and the ruinous competition in the fur trade and the unrestricted liquor traffic came to an end. The company did much for the Indians and prevented the wanton extermination of beaver in its territory. About the same time silk was substituted for beaver hair in the manufacture of hats, and this

invention also checked the destruction of the animals. Since that time beaver skins came within reach of the furrier. A good beaver skin now brings the trapper about \$8.00 and a full length beaver coat is worth about \$200.00. Beaver fur is not in prime condition until February and March, but in the early days the Indians killed some for both food and fur at all seasons, although they did most of their trapping during the winter months.

When, in 1869, the Hudson's Bay Company surrendered its sovereignty to the Dominion of Canada, the humble wild fur bearers lost their best protector, and are now rapidly following the buffalo and the elk

in all regions where they are not rigidly protected. With them the most interesting animals of our whole fauna, the founders of American commerce, the first engineers and the first lumbermen of North America, will be seen and heard no more on the streams in the forest, where their ancestors have worked and played since the leaves of the aspen first began to whisper in the summer breeze.

Where, however, the beaver is actually pro-

TECTED, it not only holds its own, but increases rapidly. This has been shown in Minnesota, Ontario, Michigan, Wisconsin, and elsewhere, for under favorable environment no animal is better fitted to take care of itself.

In 1902 three beavers, one male and two females, were set free in the Itasca Forest Reserve of Minnesota, where the species had become extinct. The liberated beavers built a house at the mouth of Nicollet creek that same fall and within ten years they had spread over the whole of the Reserve and had built about thirty lodges and had made half a dozen large ponds.

In a settled farming country, beavers would not be desirable, because their dams will flood meadows and they cut down quite a few trees and kill others by flooding their roots. In a wild country, however, the



Courtesy of the American Museum Journal

HOW BEAVERS CUT TREES

Black ash cut by beavers near Port Kent, New York. Gift of W. H. Howell, on exhibit at the American Museum. The cuttings show characteristic marks of the beaver's teeth.

trees they kill have no value. Where beaver have to be killed or removed the work should be done under the direct control of an efficient State Game Department.

Wherever general trapping is permitted, the animals will soon become extinct. I believe, that in certain wild regions as on Isle Royale, in Lake Superior, colonies of beaver might yield a reasonable income, if properly managed.

Against their natural enemies they are well protected. Lynxes and wolves cannot attack them in the water nor in their houses or burrows. I have seen



OPENING A BEAVER HOUSE

The opening in this beaver house is large enough to admit a man who is well on his way to explore the interior. Note the large branches of which it is built.

otter trails near beaver houses and it is possible that this agnostic hunter may attack them in the water or even invade their houses. A hungry eagle would no doubt pounce upon the young, but the beaver children seldom venture more than a few yards from the parental roof and castle.

To harmless woodland neighbors the beavers are indifferent and live at peace with them; and for catching glimpses of the life of the wood folk there is no better place than a beaver pond.

At one place I observed daily from my shelf-platform in a tree the feeding and playing of a brood of black ducks. A young woodchuck also browsed right below me and used the beaver dam as his turnpike. Once he tried to cross the stream on a pole, but lost his hold and fell with a splash into the water.

At another pond, a flock of Canadian jays tried to steal my bacon out of the frying pan, and at a third pond I observed the play and calls of loons that were unconscious of my presence, and I watched deer feeding for an hour near a beaver clearing.

The Indians indulged in many practical jokes at the expense of their pious Jesuit teachers. One of



HOW A BEAVER SAVED WORK

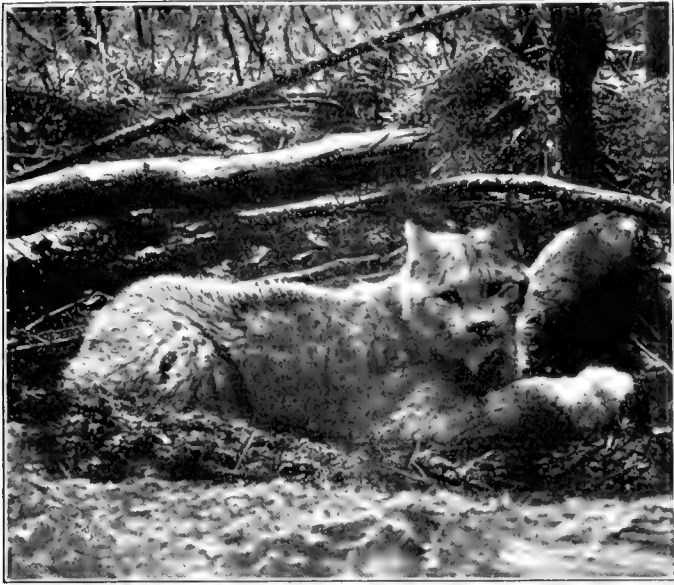
Whether the animal knew how to do it or not the fact remains that this tree was felled after the beaver had cut through only one side of it.

them, Father Joseph Louvence, tells us that the beavers have two teeth projecting from the sides of their mouths like swords and that they use these like saws in cutting down trees, that their houses are divided into several stories and that their dams are so ingeniously built that one could expect nothing better from the most skilful architect. The account shows that the good father had never seen a beaver house, a dam nor a beaver.



PINE TREE CUT BY BEAVER

Note the size of this tree and guess the amount of work required to cut it down. The power and sharpness of the beaver's teeth may be judged by the fact that some of the chips are four inches long.



A BAD NEIGHBOR OF THE BEAVER

The lynx is frequently found along the water side where beavers are active. He is one of their worst enemies, but can catch them only in the open, as their houses are lynx proof.

I had casually observed a few beaver colonies in the wilds of Northeastern Minnesota, in Northern Wisconsin and in the Itasca Forest Reserve, and so attractive did I find their habits, that one summer I devoted over a month exclusively to studying them in the Itasca Reserve; but the difficulties I encountered in trying to secure new and reliable information were at times quite baffling.

My first attempt was made at a dam and pond in a dense cedar swamp. In company with two friends



A MUSKRAT HOUSE

This is a cross section showing the interior chamber and entrance under water or ice. The boy has his left hand in the entrance to this domicile.

I made a small break in their dam and staid near the break all night. Early in the evening we suffered not a little from mosquitoes, and in the morning from cold and dampness. Several times we heard a beaver plunge and slap the water with his broad tail, and once he almost spattered water on our blankets, but the break in the dam was not repaired. At sunrise, three shivering and bedraggled naturalists were longingly looking forward to a fire and hot coffee and they had learned that beavers will not work when they know they are being watched.



NEIGHBOR PORCUPINE

The well known but carefully avoided porcupine is one of the neighbors of the beaver, although that does not prove that they have much in common, except a fondness for the same locality.

My next attempt was made on a large pond which the beavers had created by building a dam across a small creek in a more open valley. Here I built against the trunk of a large balsam fir a platform twenty feet above the ground. Two afternoons and evenings I spent alone on that platform after having made a break in the dam. On both occasions I saw a beaver swimming about in the pond as if he were scouting for the cause of the trouble. He was not alarmed and neither saw nor scented me, but he never left the pond and did not repair the dam. When it grew too dark to see anything, I left for my camp two miles away. On both occasions the break was repaired during the night. About the number of beavers living in this pond I had been able to make no direct observations.

Having been disappointed at this pond, I selected a beaver house on the shore of a small lake and directly below a high bank. This seemed a most favorable locality. I intended to observe the beavers from behind some bushes on the high bank; the house was built in the open and was exposed to the west, making the conditions of light very favorable. It was only



SIZE OF A BEAVER HOUSE

This photograph gives an excellent idea of the size and the stability of the beaver house. It is built on the edge of a pond in southern Wisconsin.

half a mile to a good log cabin and I expected good results.

But again I was disappointed. I did indeed see several beavers every evening but they nearly always scented me and gave their plunge-and-slap danger signal, which, at times, was taken up by a colony on the other side of the lake until the resounding plunges made a noise as if half a dozen concealed giants were throwing rocks into the lake. Building a platform in a jack pine did not bring better results; the beavers always knew I was there.

At last I discovered the source of my difficulties. Towards evening the wind nearly always ceased and a current of air set in flowing gently from the high bank down to the lake.

I now decided to make a large beaver house, located on a point of land across the lake, the scene of my investigations. An open grove of poplars covered this point and I planned to build a comfortable platform almost vertically above the beaver house by connecting three of the trees by means of stout poles and strong boards. On shore near my camp I built a raft and a portable ladder and cut the poles and then ferried poles, ladder and boards across. I adopted this method in order to avoid unnecessarily alarming the beavers by much cutting and hammering near their house; still it required four hours of hard work to build my observatory. Having no companion and working eight miles from the nearest settlement the work did not lack a spice of danger. That evening, knowing that the beavers would be alarmed, I re-

mained quietly in camp observing the deer-mice in the cabin and the snowshoe rabbits around the camp-fire, both of which were more numerous than I have ever known them before.

The following day I paddled across the lake on my raft in the middle of the afternoon. The raft enabled me to avoid a long detour around the shore of the lake where the going was extremely bad, especially after dark, and it also made it possible for me to land at the beaver point without noise. After dark, on the homeward trip, I steered for three white birches, near which I tied my raft within half a mile of camp. At the end of a week, however, the craft became so water-logged that the stern travelled ten inches under water, but as I did not have to travel in strong winds and big waves, the raft remained a most convenient and fairly safe transport.

Having arrived at the beaver point I ascended to my platform and waited. About 6.20 I observed a line of bubbles arising near the house and traveling rapidly into the lake, and about two hundred feet from the house, as I had expected, a beaver came up at the end of the bubble line. He scouted about, his nose turned toward the shore, but found nothing to alarm him. Soon another beaver left the house. I could see his dark body under the water but he caused neither ripples nor bubbles. He also, after rising, sniffed the shore, but in another direction, and like his fellow was not alarmed. A little later a half grown beaver cautiously put his head out among the poles at the edge



BEAVER HOUSE IN WINTER

This house was deserted for several years. Late in the fall a colony whose pond had been drained by a poacher repaired the house, hurriedly pickled a large amount of brush and occupied the house.

of the house, and not scenting or hearing anything suspicious, swam away to the feeding grounds.

At last I had found a place and method at which the wariness of the animals would not baffle me, and new facts came rapidly during the week I watched from the platform spiked to the three poplars.

On this level point of land there was no downward air current and the beavers could not scent me. To noise they were not so sensitive as I had expected. The rather loud click of a camera which several times caused a muskrat to plunge with alarm, made no impression on the beavers, and to their eyes the large platform, six feet by three, and myself sitting on it without any screen whatever, conveyed no import of danger.

As far as I could tell they did not see me at all. Once, however, I thought a beaver some hundred yards away caught sight of me against the sky line as I moved to shift my position.

Every evening between six and half past, the young beavers of the season began a sort of child-like whining. Within half an hour after that, one or two full grown animals left the house under water and arose at a distance of about two hundred feet to scout along the shore as already described. In most cases I failed to see them leave the house. Once I saw a large piece of poplar, perhaps three feet long and four inches in diameter, taken into the house under water. I could not see the dark beaver, but only the whitish piece of poplar, and the movement under water produced no ripples on the surface. About ten or fifteen minutes after the old beavers had left, the half grown yearlings generally left the house and all swam towards the feeding grounds, a quarter of a mile to the west. I think there were four of these yearlings. Once I saw



THIS DAM IS FIVE FEET HIGH

So firmly constructed is this dam that despite frequent rise of the stream it still remains firm and strong, its top five feet above the average water mark. It is in Southern Wisconsin.

them leave so close together that their bodies touched one another.

I concluded that the beavers just mentioned were yearlings because they were not full grown, and the house was also inhabited by three or four animals only about the size of muskrats. These little fellows seldom showed themselves and never followed the parents to the feeding grounds so I concluded that they did the whining I regularly heard, because I heard it after parents and yearlings had left the house. This house I now knew for certain was inhabited by about ten beavers belonging to three generations. The two parents, easily distinguished by their large size, always left the house first and scouted along the shore for indications of danger. If their suspicion was aroused, they gave the danger signal and I soon learned that after that I should see very few or no beavers that evening. If they suspected no danger they either swam away to feed or returned leisurely to the house and left again later. Near the house, they never went on land, although from my platform I could see seventeen wharves or landing places. But for some reason the beavers were feeding at this time exclusively a quarter of a mile away.

The house under the high bank also harbored parents, yearlings, and young of the season, but I secured no good evidence as to their number; however, to judge from the size of the house and other signs, the number was less, perhaps only six or seven.

The yearlings did not heed the danger signals of the parents as implicitly as they would do with the writers of nature fiction. Twice one of the parents became alarmed at my raft moored on the other side of the point and gave the plunge-and-slap signal, but the yearlings near the house paid no attention to it although the alarmed parent was not more than two



WOMEN WALKING ON BEAVER DAM

Not many women have walked over a beaver dam and those who have see no particular reason why they should do it a second time. These are members of the Minnesota Forestry School at Itasca Lake, Minnesota.

hundred feet away. The youngsters reminded me of boys who go their own way in life, feeling satisfied that the old man doesn't know what he's talking about.

Contrary to a statement made in a very reliable natural history, the muskrats and the beavers lived entirely at peace with each other, one paying no attention to the other. In the house below the high bank beavers and rats also lived together peacefully, but in both cases the rats generally used small entrances close to shore, and I think they lived in a small cavity in the bank by themselves. In a third house muskrats were also present, but I did not learn on what

man's thumb. The next moment, seizing the butt with his mouth or fore feet—I could not make sure which—he swung the leafy branch over his left shoulder from which it slid off almost immediately; he then seized it with his teeth, dragged it into the water, dived with it and took it into the house. No sooner had he entered than the babies of the family set up a lively whining in appreciation, as I imagined, of the prize the big brother had brought in. This was the most intimate glimpse I had of the beavers' home life and was the only time I saw a beaver on land.

I noted that the beavers never touched the other poplar tops I had dropped almost on their house and they had practically done no cutting in the poplar grove near their house. They nearly always left the house at the same exit and, after the old ones had scouted along the shore, both parents and yearlings often swam directly to their feeding place about a quarter of a mile to the west. Several times I watched one swim as straight as the crow flies with a speed of about one hundred yards a minute.

The most remarkable beaver structures are the dams, built across small streams and creating the well-known beaver ponds. Dams from a hundred to three hundred feet long are common, and in rare instances a beaver dam may reach a quarter of a mile in length. The height of a dam varies from a few inches near the ends to five or six feet in the highest places. It is built of dead brush and sticks held together by mud scooped and dug up immediately above the dam. The beavers had cut no standing trees for any of the dams I had seen. No stakes are driven into the ground and no large rocks used to hold down the brush. The dams are not given any artistic finish, and look as if a lot of boys had built them; but by being kept in repair they hold the water in the pond. The amount of work expended in their construction is very large, considering that a beaver averages only about thirty pounds in weight and has only his small fore feet to use as hands and his four chisel-like teeth for cutting brush, trees and sticks, or for seizing his material when he drags or floats it to his house or dam. I estimated that duplicating a certain three hundred foot dam would take a man equipped with pick, ax and shovel about four weeks.

The streams which the beavers dam up to make their ponds vary in size from insignificant rills to streams large enough to carry a row-boat. In the late fall of 1912 they built two dams across the Mississippi where the stream issues from Lake Itasca. A beaver pond is frequently a quarter of a mile long and covers an area of from five to ten acres, but ponds have been observed covering from fifty to sixty acres. None of the ponds in the Itasca Reserve are over ten years old, but in the early days a well located beaver pond may have been occupied for a century or longer, although the life time of an individual beaver probably does not



WHERE BEAVER THRIVED

Scene in a poplar grove in winter after the beavers have cut down and pickled their supply of brush and food poles. This is in the Itasca Forest, Minnesota.

terms they lived with their larger relatives. At Poplar Point rats fed almost entirely among the lilies and other plants in a little bay in which the beaver house was located, and seldom traveled more than a few rods from home, but they also ate the foliage and bark of poplar on the beaver house. They generally appeared about half an hour before the beavers came out. The beavers, on the other hand, all swam to the feeding ground a quarter of a mile away, where three kinds of water lilies grew in abundance and where they had also done much fresh cutting among the poplars on shore.

The most interesting observation I made on the last evening I could spend on my platform at Poplar Point. Beavers began to show themselves very freely about seven o'clock; once I saw four or five at the same moment. About 7:45 a beaver, a yearling to judge by his size, came very carefully out of the house. He hesitated a minute, and then, almost directly below me walked slowly up to a green poplar I had cut the night before and with a few lateral movements of his head cut off a twig the thickness of a

extend beyond ten or fifteen years. Of all the wild and weird places one comes upon in the primeval forest, a beaver pond is the most desolate. As the water backs up from the dam, the cedars, tamaracks, spruces and firs gradually die and within a few years they begin to lean and fall in all directions, while long tufts of gray lichens hang, like gray funeral wreaths, from every dead bough. Few men can spend a night alone at a beaver pond without having the primitive fear of the wilderness creep in upon them.

Beaver houses are constructed like the well-known muskrat houses which every country boy has seen in sloughs and sluggish creeks, but the beavers use sticks, poles and mud as building material instead of the rushes and mud employed by their small cousins. A large beaver house stands about five feet above the water and measures from fifteen to twenty feet in width at water level. A large house at the south end of Lake Itasca could be clearly seen at the distance of a mile and a half. Each house has two or more entrances, always under water, but it has only one cavity where from six to ten beavers live, sleep and eat. I found no bedding in the deserted houses I opened, but the cavities were large enough that a man might use them as places of concealment.

The beavers seem to prefer building their houses in ponds where they can control the water level and where no enemy, except man, can reach them, but they also build many houses against the banks of lakes and some of them live in burrows near the water, which was undoubtedly the manner in which their ancestors lived long ago. How and when they learned to build dams, create artificial ponds and build their dome-shaped houses we can, at present, only surmise.

Some of the extinct relatives of the beavers were several times as large as the present race, and one grotesque species was even provided with horns.

Fully as striking as the hydraulic engineering of the beavers is their lumbering. The term beaver clearing is not hyperbole, for they frequently fell from one to two hundred trees, occasionally taking a tree of two feet in diameter, but they prefer trees from a few inches to a foot thick. Just as the tiny wild mice cut down grasses to secure the seeds, the beavers fell trees to feed on the twigs and on the bark of the boughs. Accurate observation shows that they do not determine the direction in which the trees fall. Most of them fall naturally toward the pond or lake; but in a large clearing trees may be seen lying in all directions and many become lodged in the tops of other trees. These lodged trees do not fall to the ground and are lost to the beavers. An intelligent lumberman secures every tree he cuts.

For use during winter they cut boughs and trees into sticks and poles varying from about two to six feet in length and reaching six inches in diameter. This material they pickle in the cold water near their houses, just before the lakes and ponds freeze over,

and at this time of the year they are as busy as farmers in harvest and haying time.

Their favorite food is the brush and bark of the common poplar, but they also eat balsam poplar, cottonwood, white, yellow and dwarf birch and a few other deciduous shrubs and trees, but no evergreens. They are strict vegetarians and if their home stream contains any trout, some big fish may be looked for in the beaver pond.

Very remarkable also are the beaver canals and ditches. They are dug to a width of two or three feet and are from one to two feet deep. They connect natural lakes, marshes and ponds or run from a pond to their cuttings. They use these canals for purposes of travel and for floating their food to their houses. I found one fifty feet long connecting two natural lakes, but Lewis H. Morgan, a careful observer writing about 1865, observed one in Michigan which was two hundred and eighty feet long.

The beaver is a rodent and resembles in appearance a large muskrat. He is very dark brown in color, but has a black, paddle-shaped tail. The hind feet are webbed and act as powerful propellers in swimming, while the fore feet are rather short and not webbed and are used like hands. The story that beavers carry mud on their naked, scaly tails, and that they use them as a trowel, is a fable. The tail is admirably adapted to regulate their up and down movements under water, but whether they steer themselves with their tails or their feet I have not yet been able to learn.

Recently I made a midwinter trip to the beaver colonies in the Itasca Reserve. Near several of the houses I could clearly trace their brush piles of winter food, which extended from twenty to thirty feet from the house and were about ten feet wide. One old house, which had been vacated for three years, a family had repaired late in the season and had then hurriedly provided themselves with whatever food happened to grow nearest at hand. Their brush pile contained only white and dwarf birch, and a little white elm, black ash and alder. Evidently they had not had time to go after poplar.

A well located colony in a pond on a small creek had been able to do things right. They had built three dams and created three ponds above their home pond. On the bank of the upper pond they had cut their winter food and had then floated it down from pond to pond half a mile to their house. The three upper ponds contained no houses and had only been used for the transportation of food.

On all inhabited ponds the animals had made a small opening in the dams when the ice was about three inches thick. In this way they had probably provided small air holes near stumps and trees and in front of the dams, because about a foot of water had run out of the ponds and the ice had settled down to the water level. By this procedure they had also pre-

vented the water from flooding the ice and rising into their house or causing uncontrollable leaks in the dam.

The domes of their houses freeze hard in winter, and while wolves and deer and all kinds of animals pass freely over the frozen ponds, it is impossible for any creature, except a man with an ax, to open a beaver house in winter.

I would not ascribe human reason to the beavers, but in the sphere of their own peculiar life and activities they do certainly display such a marvellous instinct and adaptability that one is ever tempted to ascribe at least a high degree of intelligence to them. However, comparing the beaver's intelligence with that of wolves, domestic dogs, coyotes and foxes, I should rate it rather low. The wild flesh-eaters have every man's hand against them, but still they hold their own. With remarkable adaptability they have learned to avoid guns and traps, hounds and even poison. The beaver has become wonderfully adapted to an aquatic life and to the advantages of his ponds, dams and houses, but as compared with the wild canines the castors seem a dull tribe. It is easy to trap all or nearly all of a colony of beavers, but nobody ever trapped all of a pack of wolves. Wolves hold their own wherever they find food and shelter. Beavers became extinct over immense areas where their food and shelter existed in abundance, because they adhered stubbornly to the ways of their ancestors. They were guided too largely by instinct and were too slow to learn.

I shall illustrate by three instances how tenaciously beavers follow the bidding of instinct and how slow and dull they are in grasping a new situation.

A pair of beavers built a dam across a creek which furnishes the water for the State Lodge in the Itasca forest. Twice the dam was torn out and twice the beavers came at night and put it in again. Then a lighted lantern was left near the place. The first night they avoided the place, but during the second night they again built their dam. Then in despair, the lodge keeper set a steel trap and caught one of the beavers. When after daylight the man approached the trap, the animal broke away, leaving one of his

toes in the trap, and at last this beaver and his mate understood that this creek was not a safe place for building a dam.

Two other interesting instances bearing on the beaver's intelligence have come to my notice. I was watching beavers from my platform on Poplar Point. As already told, both beavers and rats inhabit the same house and both were perfectly at home with each other. One evening about 7:30 a muskrat came swimming home with a water lily leaf, which had accidentally turned up on edge. Almost directly below me a yearling beaver was lying with his head out of the water. When the rat approached him within about a foot he took a sudden fright and dived and rushed into the house in such a wild panic that I could see only a streak of swirling water. This beaver had many times seen a rat come home with a lily leaf, but at the somewhat unusual position of the leaf he was thrown into a panic and rushed for the house.

One of my friends, a forester, saw a beaver on shore toward evening. A rabbit hopped out of some bushes near by, and the beaver rushed into the water in a wild fright. There were literally thousands of rabbits in the Itasca woods and the scent and shape of a rabbit must have been well known to the beaver.

This tendency to panic does not speak for a high grade of intelligence, but it must be admitted that a tendency to rush for the water or the house would be beneficial to the beavers against their four-footed enemies.

But though we admit freely that the Indians and early writers overrated the intelligence of the beaver people, their ways and works will always lure the naturalist into the wilderness.

Nature has been most sparing in the bestowal of her greatest gift. Where the dim, flickering candle of animal instinct and intelligence has been sufficient, she has not turned on the brilliant searchlight of human reason.

The works of the beaver, executed under the guidance of a human mind, would be nothing remarkable; only when accomplished by a creature guided by instinct and a humble animal mind do they appear truly wonderful.

CHESTNUT blight has already done damage in Pennsylvania estimated at from \$9,000,000 to \$10,000. No tree attacked by it has ever been known to recover, although dozens of fake remedies have been brought out.

O. M. BUTLER, assistant district forester of the United States Forest Service, Albuquerque, New Mexico, has been appointed assistant director of the Forest Products Laboratory, at Madison, Wisconsin, and has assumed his duties. Mr. Butler has been engaged in Forest Service work for ten years, principally in the West, where he was at different times assistant district forester in various districts.

UNRESTRICTED grazing in the woodlot is a losing proposition. The farm woodlot cannot serve profitably for the production of timber and also as a pasture for stock. Either all grazing should be stopped and the area given over exclusively to the growth and reproduction of trees, or else the trees should be cut and the land used for the production of grass.

IT has cost France over \$30,000,000 to learn that denuded forest areas must be reforested. Pennsylvania and other states are learning the same lesson in the same way.

MARSH LAND AND OTHER AQUATIC PLANTS

By DR. R. W. SHUFELDT, C. M. Z. S.

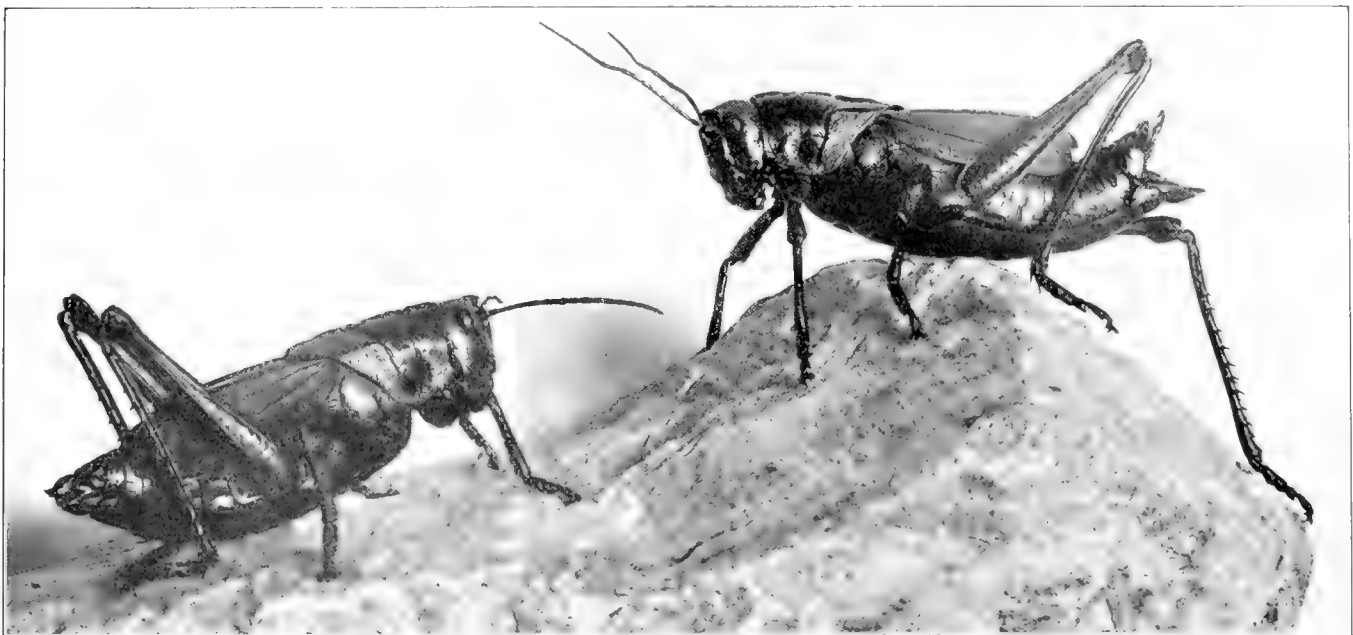
FREQUENTLY, while carrying out their instructions or making their investigations, our foresters are not always confined to the high timber lands or to the forests of the valleys and more level stretches in the regions where they are on guard. Often slow streams have to be crossed, swamps waded, or lakes and big ponds skirted, as they follow the many itineraries throughout the heavily timbered parts of the country where their duties call them. In these latter localities they will be very sure to meet with a great number of our water or aquatic plants. Some are more or less inconspicuous forms, and so rarely attract attention; but upon the other hand many of them are among the most visible of any of the representatives of our flora, and the present article will be devoted to giving brief accounts of their characters and other points, through which they may be readily recognized.

Let pickerel weed be taken as the first example, and we have two good figures of it illustrating the present article. Many who have pulled or paddled through miles of it in a boat or a canoe; who have seen thousands of its beautiful, purplish-blue flowered spikes, and who are more or less familiar with its stems and leafage, have never happened to find out that the name of the genus in which it belongs is *Pontedaria*, it having been named for Giulio Pontedera, the famous botanist of Padua, who flourished in 1730, nor that the deer up in the Adirondack Mountains regularly go down to the shores of the

lakes there to browse upon the leaves of this very same pickerel weed. Its flowers are extremely ephemeral, and bloom but for a single day. Mathews is mistaken when he says that it is a tall plant, "with one blunt arrowhead-shaped, dark green, thick leaf," for we frequently find specimens of the plant supporting *two* such leaves—indeed, such an example is here figured. Another peculiar thing about the pickerel weed is the fact that its fruit—a curious little bladder-like affair—contains but a single seed. It is also said that the flowers of this plant are sometimes *white*, and such specimens have been most frequently observed in the northern parts of its range. It blooms from July to the middle of September, and it is often associated with the arrowhead, to be described further on.

Pickerel weed flowers are comparatively safe from the ruthlessness of the wild-flower vandals, for most of them are found along the river banks, and those growing in a pond are too far out in the water to be reached, which fact is the best protection that the plant possesses.

Doubtless pickerel lay their eggs among the leaves; and there is no doubt but that this splendid fresh-water game fish is frequently found in abundance where the plant grows. Then, too, the insects attracted by the blossoms often fly low over the surface of the water; a hungry pickerel may take a fancy to some of these, so that, by a sudden leap, he may succeed in capturing such tidbits. It may be said in passing that the pickerel weed



OUR LARGEST SPECIES OF GRASSHOPPER

This is the lubber grasshopper or locust of the southern United States. It is a remarkable large-bodied genus, with short red wings, and shiny, jet black body; the antennae or horns are also short. Its scientific name is *Rhombaleum micropterum*, and it has a near relative in the West which is a greenish species. In the environs of New Orleans, the very small, intensely black young ones hatch out in the cracks in the dry, verdureless patches in the woods, and at a short distance look like little black anastomosing veins on the ground. Dr. L. O. Howard says: "It occurs frequently in enormous numbers in the rice fields near the mouth of the Savannah River, and is an extremely disagreeable object on which to step; in fact, it reminds one of Thackeray's famous remark when he swallowed his first saddle-rock oyster." The two males here shown are New Orleans specimens.

family (*Pontederiaceae*) contains but one other plant besides the true pickerel weed, and that is the mud plantain (*Heteranthera reniformis*), which bears but very slight resemblance to the former.

The story of the very essential cross-fertilization of the flowers of the pickerel weed reads, as we often say,



A GLIMPSE OF THE HISTORIC POTOMAC

View from the Maryland side of the river, below Great Falls. On the bank in the foreground is seen growing both Broad-leaved Arrow-head (*Sagittaria latifolia*) and Pickerel Weed (*Pontederia cordata*). The trees here shown are upon a small island, where, in days gone by, a pair or two of turkey buzzards used to breed.

like a fairy tale. It seems that there are three kinds of blossoms on the spike, "one raises its stigma on a long style reaching to the top of the flower," says Neltje Blanchan in her excellent account of it; "a second form lifts its stigma only half way up, and the third keeps its stigma in the bottom of the tube. Now there are two sets of stamens, three in each set, bearing pollen grains of different size and value. Whenever the stigma is high, the two sets of stamens keep out of its way by occupying the lowest and middle positions, or just where

the stigmas occur in the two other forms; or let us say, whenever the stigma is in one of the three positions, the different sets of stamens occupy the other two. In a long series of experiments on flowers occurring in two or three forms—dimorphic and trimorphic—Darwin proved that perfect fertility can be obtained only when the stigma in each form is pollenized with grains carried from the stamens of a corresponding height. For example, a bee, on entering the flower, must get his abdomen dusted with pollen from the long stamens, his chest covered from the middle length stamens, and his tongue and chin from the set in the bottom of the tube nearest the nectary. When he flies off to visit another flower, these parts of his body, coming in contact with the stigmas that occupy precisely the position where the stamens were in other individuals, he necessarily brushes off each lot of pollen just where it will do the most good. Pollen brought from high stamens, for example, to a low stigma, even should it reach it, which is scarcely likely, takes little or no effect." As pointed out, cross-fertilization is extremely essential, and in these "three-formed" flowers there are two chances to one of securing it." Darwin



A FAMOUS PLANT OF THE SWAMPS AND RIVER BANKS

This is a beautiful specimen of the Pickerel Weed, the spike on either hand being in full bloom, while the center one has gone to seed. So luxuriantly does this plant grow in some rivers that it has greatly interfered with navigation, and special means have been recently devised in order to clear the usual shipping tracks of it. Three forms of Pickerel Weed are described,—that is, different flowers on different plants, and the whole group depend entirely upon visiting insects for fertilization. In late summer, when creeks, swamps, and ponds dry up, the Pickerel weeds turn brown, wither, and die, and frequently the seeds are lost in the dry mud wherein the sorry plant now finds itself.

made hundreds of such experiments, all with the same patient care and thoroughness, describing them with marvelous lucidity and point. Little wonder that when his life ended England found a place for him in Westminster Abbey.

Growing with the pickerel weed, we frequently find another famous aquatic plant, the arrow-head, a specimen of which is shown in one of the accompanying figures; the fertilization of its flowers, too, is a story most wonderful in all its details, but it would occupy too much space to give in detail here. There is but one thing to do: "Get your botany," and bring your compound microscope into play. Although a thousand cannon are barking away as these lines are being written, we must not overlook the fact that the war must come to an end some day; the far-seeing wise ones will not put entirely aside scientific research until it is over. When the upbuilding and the uplifting again fills the room of killing



THE ELEGANT SPIKE OF THE PICKEREL WEED

This gives the purplish-blue flowers full size, in that their great beauty may be better appreciated. The distal portion of a leaf of this plant is shown below, with a young, sheathed spike just ready to burst open. Each plant has several leaves, and they sheathe the main stems as shown in one of the figures. They appear truly gorgeous in the bright sunlight of summer; and they are not only beautiful but extremely picturesque as they line, in thousands, our river banks at this season.



ONE OF OUR MOST CONSPICUOUS AQUATIC PLANTS

This, the common large Yellow Pond or Water Lily, also called the Cow Lily or Spatter-dock (*Nymphaea advena*), is another strictly aquatic plant of our flora of very wide distribution. It prefers the shallow shore-stretches of slow streams, and less frequently extensive ponds or standing fresh water anywhere. In suitable localities it may be found from Nova Scotia to the Gulf, and westward to the Rockies. This species is almost entirely scentless, while its beautiful relative, the great white water lily, has a flower that is extremely fragrant—indeed, so much so that it has been called *Castalia odorata*.

and destruction, no one of the many departments of biology must be utterly dead—as has previously happened in the world's history.

There are a good many species of *Sagittaria*, but they all belong, with numerous other genera, in the water plantain family (*Alismaceae*). The one to be described here is the Broad-leaved Arrow-head (*S. latifolia*) (see figure). It is well named, for sagitta is an arrow, while the specific name refers to its broad leaves. One of its chief charms is its decorativeness, and hardly any one can pass the plant in nature, where it is growing luxuriantly, without being struck by its peculiar beauty. Its flowers are arranged in groups of three, and are very striking from the fact that they are so glistening white. Below them, also arranged in groups

of three, we find the inconspicuous pistils, hardly entitled to be called flowers. The two sex-elements frequently occur on separate plants; but this does not prevent cross-fertilization through the agency of visiting bees and flies, so the plant is sure of perpetuation.

One of the most remarkable things about this arrow-head is the fact that the plant frequently develops two kinds of leaves—a character often to be observed in other aquatic plants. The broad, arrow-head shaped ones are grown above the surface of the water, where they are exposed to the air, and can assimilate from it the maximum amount of carbonic acid, as well as release the greatest amount of oxygen. These leaves are shiny and more or less thick and tough; they also endure should the water dry up where the plant is growing. Now those below the surface of the water are like long, narrow ribbons, so formed in order that the river current may not destroy or even mutilate



THE SNOW FLAKES OF THE MARSH LANDS AND RIVER BANKS

In shallow water and muddy tracts, this, the Broad-leaved Arrow-head (*Sagittaria latifolia*) flourishes, in its chosen localities, from the sub-polar regions to the Rio Grande and the Mexican boundary westward. As we flounder through a marsh where thousands of its kind grow in crowded masses, we are sure to be struck by its glistening white flowers, with their brilliant golden centers, as they peep out here and there among the army of broad, sagittate leaves that surround them upon all sides.



ONE OF THE MOST GLORIOUS FLOWERS IN ALL NATURE

The Pond Lily or Sweet-scented Water Lily (*Castalia odorata*) is known to nearly everyone, not only throughout America but in the Old World. It blooms all summer long in many localities, being a plant confined to ponds, lakes, and sometimes to rivers without a perceptible current. The picture here given is from a steel engraving of one of the late Dr. Robert Collett's superb series, copied from one of his remarkable photographs made in Norway, where this plant is also found.

them, which it would be likely to do were they like the ones above the surface. These long, delicate, subaquatic leaves are also exposed to the air contained in the water, and so perform a similar function with respect to giving off carbonic acid and the absorption of oxygen. When the water dries up, as often happens during long, dry summers, these latter leaves shrivel up and entirely disappear. In fact, such plants must be amphibious although stationary, and be able to *breathe* as an aquatic plant as well as a terrestrial one. Wonderful indeed are the results that have come about since the time plants first appeared on this planet, and similar marvelous changes are still in progress upon every hand. To understand most of these we must needs study industriously and intelligently — all the thousands upon thousands of fossil plants that science has collected and classified.

Writing about the arrow-head, Alice Lounsberry quaintly remarks: "The demure arrow-heads are surely the Quakers of the flower-world; and that they do not

condone frivolity, we may gather from the way in which they keep their pistillate and staminate members apart. The pistillate ones also deck themselves in very seemly little petals that fall early and do not vie in comeliness with those of the staminate blossoms. It hardly seems possible that one of these little under-flowers would ever have the courage to call out boldly: 'Joseph, thou art keeping the sunshine from falling upon my head.'"

All through the Gulf States is a fine region in which to study aquatic plants. In the country about New Orleans, some of the big, stagnant ponds are good places in which to study the lilies, the wonderful growth of grasses and sedges, and plants that flourish in wet places generally. As one passes from pond to pond in the summer time, remarkable flowers may be collected, and no end of interesting animal forms observed. Among the latter we may note thousands of specimens of the big, black lubber grasshopper, of which insect a reproduction of a photograph is here presented. As throughout all the eastern part of the United States and westward, we meet,



IN THE HEART OF A MARYLAND SWAMP

It is in the water and deep mud of such a place as is here shown that our Broad-leaved Arrow-head flourishes in all its glory; it is associated with Cat-tails, Monkey-flowers, Pink Milkweed, Cone-flower, Bind-weed, Common Dodder, and many other marsh and aquatic plants.

along the sluggish streams and in standing water generally, the very abundant cow lily or Yellow Water Lily, of which a cut is likewise given. The specimen shown, however, was collected at Warwick, Virginia, where the plant is very abundant along the shores of the Potomac River. It grows in dense masses, filling up extensive inlets and marshes connected with the stream; it is associated with species of arum and other aquatic plants. Chester A. Reed, in his very useful little "Flower-Guide," says of it that it "is not unattractive, and is interesting in its makeup. The leaves are thick, rough, ovate, slit or lobed to the stem, which is long and hollow. The flower is raised above the surface of the water on a long hollow stem. What appears to be six large green and yellow petals, are in reality sepals; the real petals are numerous, stamen-like, inserted with the very numerous stamens under the golden-yellow rayed disk that forms the stigma." (P. 66.) Some people call them "frog-lilies" because they flourish best in big ponds with muddy bottoms. Our English friends have named them "brandy-bottles;" but for what reason it would be hard to say, as there seems to be nothing in their odor, their general appearance, or in the form of their fruit that would suggest such an object as a bottle—especially a brandy bottle. The country folk in England say, when they smell this lily they are reminded of the odor of an *empty*

brandy bottle that originally contained that liquor. Strange notions some people have! In any event, the odor is not a very pleasant one; but this may be forgiven for the sake of the memory of the many boating-trips on the ponds which it revives.

In the yellow pond lily cross-fertilization is effected, as in so many other plants, through the agency of insects, they being attracted by the highly colored sepals. Some small beetles (*Donacia*), and various species of bees and flies are also attracted to these flowers, and assist in the perpetuation of the species. Besides *N. advena*, the one here being described, Gray gives two other forms of the plant, namely *N. microphylla* and *N. sagittifolia*, with a questionable hybrid, *N. rubrodisca*, all being found in the eastern part of the United States.

In their usual poetic vein, Ellen Miller and Margaret



THE GREEN SPATHES OF THE ARROW ARUM

This very abundant and stately plant flourishes in swamps, ponds, and along the banks of slow-running rivers all over the eastern part of the United States. Many know it as the Green Arrow Arum (*Peltandra virginica*), its dark green, glossy leaves being of enormous size, the plant itself often attaining a height of upwards of five feet or more. Sometimes they occur in masses of several acres, and are generally rooted in soft, deep mud, some of the shorter plants occasionally growing on the adjacent dry short line; they are then less luxuriant.

Christine Whiting say, in their "Wild Flowers," that this yellow pond lily is "a flower of primitive type; the combination of yellow and red in the star design of the pistil is suggestive of Egyptian color and design." (P. 36.) Mathews notes that "On the first opening of the flower there is a triangular orifice over the stigma, so small that an entering insect must touch the stigma. On the following day the flower expands fully and the anthers beneath the stigma unfold, spread outward, and expose their pollen. Cross-fertilization is thus insured and is generally effected by means of the bees of the genus *Halictus*, and the beetle named *Donacia piscatrix*, as has been announced by Professor Robertson.

Our Water Lily family (*Nymphaeaceae*) contains besides the Yellow Pond Lily just described a number of other very beautiful or very interesting aquatic plants. None of these are better known or more generally admired than the common Water Lily or Water Nymph, of which fine examples are here shown in one of the accompanying cuts. Three other genera make up the group, insofar as our United States flora is concerned. These are the Water Chinquapin (*Nelumbo lutea*), also called the Yellow Nelumbo; the Water Shield (*Brasenia schreibeii*), and finally the Cabomba (*C. caroliniana*), a pond plant found from southern Illinois to Florida and Texas.

No species of all these can compare with the White Water Lily. As elsewhere pointed out, this superb aquatic species, with its great, white flowers, has almost a cosmopolitan range in the temperate belt of the Northern Hemisphere. Many gorgeous varieties have been bred from it, and these, from white to the darker shades, run through many yellows and reds of every conceivable



VIEW IN THE MARSH NEAR SOMERSET, MARYLAND

Here is where you find the Cat-tails and Broad-leaved Arrow-head growing in the greatest luxuriance. Many aquatic ferns and other water plants are profusely mingled with them, while the trees beyond mark the limitations of the swampy area.



AN ANOMALY IN A MARSH PLANT

As a rare coincidence, we sometimes meet with double cat-tails. Here is one that was collected in Washington during the summer of 1915. Two beautiful Monarch butterflies are resting upon these pistillate flower-heads. Note how thoroughly their markings agree; there is no doubt about their being of the same species (*Anosia plexippus*).

tint. Some of their forms, too, are extremely unique, and many fetch high prices in the flower markets of the world.

After all is said, however, none of these fancy varieties—they are all very unstable varieties—appeal to us like the pure white common one of our lakes and ponds. "To my mind," says Reed, "it leads all other flowers in beauty, grace, purity and fragrance. It is composed of four sepals, greenish on the outside and whitish within, and numerous pure, waxy-white petals. They sometimes are gigantic in size, often spreading five or six inches across."

Neltje Blanchan, too, breaks forth in raptures when she begins to write about this very same White Water Lily of our ponds—thus: "Sumptuous queen of our native aquatic

plants of the royal family to which the gigantic *Victoria regia* of Brazil belongs, and all the lovely rose, lavender, blue, and golden exotic water lilies in the fountains of our city parks, to her man, beast and insect pay grateful homage. In Egypt, China, India, Japan, Persia and Asiatic Russia, how many millions have bent their heads in adoration of her relative, the sacred lotus! From its center Brahma came forth; Buddha, too, whose symbol is the lotus, first appeared floating on the mystic flower (*Nelumbo melumbo*, formerly *Nelumbium speciosum*)."

White lilies in nature close up all night, and open a short time after sunrise, when they load the air with their delicious fragrance; again they close up from noon on till eventide.

For many years a controversy has been indulged in, often at a lively rate, among botanists, as to the correct interpretation of the metamorphosis of the stamens and petals of this white lily, and it still seems to be a mooted question even at this late day. Some claim that

certain of its petals are developed from its stamens, while others entertain the very opposite opinion. The stem to the flower is sometimes of very considerable length and very red, while the round, semi-heart-shaped leaves float flat upon the surface of the water, where they expose their entire upper surfaces to the air — a most necessary provision. See the little puddles of rain that have formed upon them in Professor Collett's magnificent picture here reproduced in one of the cuts.

Water lilies are fertilized by numerous aquatic insects, as well as by bees and various species of beetles. The stamens and anthers are of a golden color and arranged concentrically. In the winter these lilies sink to the bottom of the places where they grow, and hide in the mud until the return of warm weather; it was from this fact that they gained the name of Water Nymph. During chilly evenings, it is said, they will also disappear under the surface of the water, and not reappear until the morning sun once more warms up the cool air. If you look sharp, you will sometimes meet with specimens in which the waxy, white petals are tinted pink; the plant may also present other anomalies in its makeup.

One of the most conspicuous plants that we have among the ones growing in great abundance along the muddy shores of slow-running rivers, such as the Potomac below Washington, is the giant-like



ONE OF THE MOST DECORATIVE OF ALL WATER PLANTS

The Cat-tail Flags belong in the genus *Typha* of the Bur-Reed family (*Sparganiaceae*). There are two species of them in our country, they being the Common Cat-tail here shown, which is found throughout temperate North America, and *Typha angustifolia*, a narrow-leaved form, which is found near the coast and not further South than North Carolina.



AN ELEGANT GROUP OF PITCHER PLANT FLOWERS

This gives a perfect flower, front view, and next in height to the tallest specimen, which is commencing to go to seed. It will be noted that the form of the granulated capsule varies considerably. The seed pod is well shown in a specimen on the left, and the appearance of the back of the flower is seen in the center of the illustration. Some call this the Side-saddle flower, but for what reason is hard to say. Others have applied the name of Huntsman's Cup to it, though no well-informed huntsman ever drank out of one of them; as a rule, huntsmen do not relish stagnant water, full of dead insects, nor drink out of a half-washed cup that once contained such a mixture.

growth known as the Green Arrow-arum; its leaves may be at least two and a half feet in length, and the spathes—three of which are shown in the cut—are over a foot long. They are of a dark, glossy green color, and yellowish along the fluted margins of their slit-like openings. Upon studying one of these, it is to be noted that it forms a sheath snugly enfoldng the spadix within. On this latter grow the inconspicuous florets, which are both pistillate and staminate. Flies passing up and down over these effect fertilization. Later on the green berries appear, and soon after the stalk bearing them curves over, to such an extent that its distal pointed end is forced into the mud in which the plant grows. Here its decaying structure acts as a fertilizer for the germinating seeds, and the species is thus perpetuated.

Coming to the extremely curious and most remarkable pitcher plant, it may be said that scant justice could be done it in the remaining paragraphs of this article; and, as a matter of fact, it is intended to devote an entire contribution to its history later on. For the present, the two illustrations here presented must suffice until another day, when more reproductions of photographs will be in order, with a full account of its unusual flowers; its still more unique leaves; its range and flowering season; its habitat and allies, indeed, its entire history will be dwelt upon in detail and with all the fulness that it most surely deserves.

In many marshes, and in shallow ponds with soft, muddy bottoms, there grows, throughout North America, the picturesque cat-tail, of which there are two species in the United States—that is, the Common Cat-tail (*Typha latifolia*), and the Narrow-leaved Cat-tail (*Typha angustifolia*), found only

from southern Maine to North Carolina and westward.

In favorable localities the common cat-tail may grow to become nearly nine feet in height, the ribbon-like leaves passing beyond, or rather above, the russet brown



ONE OF THE MOST CURIOUS PLANTS IN AMERICA

This is the far famed Pitcher Plant (*Sarracenia purpurea*), which has claimed the attention of writers and others for nearly two centuries. It is named for Dr. Michel Sarrasin, who first sent specimens of it to Europe. He was a physician at the Court of Quebec in the early days of the eighteenth century. This will account for his not having sent the Southern form of the plant (*S. flava*), which flourishes in the bogs of Virginia and southward, usually flowering in early April. The flowers of the plant here shown are on the wane, while perfect ones are presented in another cut below. Another pitcher plant is found in the swamps in certain parts of Guiana, South America.

AT the recent annual meeting of the Landowners' Co-operative Forestry Society in Edinburgh, Sir John Maxwell made an address in which he stated that the war has brought about a considerable change in the public attitude toward forestry. With large tracts of woodlands throughout the country being swept clear of their trees the importance of the whole question is being brought home to the public as never before. Sir John Maxwell pointed out that the cutting of trees should be fairly distributed over the country and that poor and understocked woods should be utilized in preference to flourishing plantations which are entering their period of most rapid increment and which will be needed for the period of reconstruction. The work of the Landowners' Co-operative Forestry Society is along the line of far-sighted organization of effort and resources, both as to cutting and planting.

flower-heads. These latter have both staminate and pistillate elements upon them; and, curiously enough, not possessing either petals or the ordinary parts of a true flower, they are quite independent of fertilization by insects. In the cuts here given, the upper part of the flower-spike is not shown—that is, not fully; it is only in the double specimen that its stem is, in part, seen above. Stamens occur only in the superior part or half, while the inferior moiety consists of the pistils; these are the flowers that are fertilized by the yellow pollen falling upon them from above. What we are most familiar with are the cylindrical, light snuff-brown heads, which appear along in August and September (see cuts). One of these is composed of a densely packed down, made up of the pistillate flowers which are bractless. The remainder of the flower essentials have withered and blown away long ago. Specimens of these elegant, pistillate parts may be over an inch in transverse diameter and nearly a foot in length.

Sometimes cat-tail swamps are of great extent, covering acres of marshy, or rather muddy shores of slow-running rivers and inland bodies of water. As plants, they seem to be just as well suited to salt water as to fresh, and they thrive growing in either. Fifty or more years ago there was an extensive cat-tail growth in a salt water marsh, in an inlet not far from the steam-boat landing at Stamford, Connecticut. In those days our common barn swallow was extremely abundant, and at nightfall a great many thousands of those birds used to roost on the leaves and heads of the cat-tails in that marsh, sometimes in such immense numbers as to crush down the plants in masses. Many other kinds of birds delight in making their homes in the cat-tail swamps, and most of the species build their nests and rear their young there. Among these species we are familiar with the several species of rails and bitterns; the red-wing blackbirds, and various species of sparrows; the different kinds of rails and coots; the cute marsh wrens, which build curious ovoid nests; and sometimes a short-eared owl and a pair of marsh hawks.


AS an interesting example of the problems which a forester has to work out, it is said that forest officials in India have undertaken to girdle undesirable trees in order to kill them off and give more room to the Deodar and other valuable species. Himalayan bears, however, have discovered that the sap from these girdled trees is sweet and toothsome and have undertaken some girdling on their own hook. They have caused a good deal of trouble because they do not confine their operations to undesirable trees.

SHIRLEY W. ALLEN, of the Extension Department of the New York State College of Forestry at Syracuse University, has been appointed, temporarily, to succeed Victor A. Beede as secretary of the New York State Forestry Association. Mr. Beede has gone into forest fire insurance work at Portsmouth.

SELECTING NUT TREES FOR PLANTING

By C. A. REED

Nut Culturist, United States Department of Agriculture

 IN the planting of trees for most purposes, it is now possible to exercise practically the same degree of choice with regard to special fitness as is employed in the selection of men for positions or tools for a piece of work. The fruit grower in every part of the country has his special species and pomological varieties from which to choose. The foresters and landscape gardeners have their species and botanical varieties or improved strains to pick from.

Among the important purposes for which trees are planted, the production of native nuts is singularly behind. The leading species of native nut-bearing trees include the hickories, the walnuts, the chestnuts, the pines, and the beech. Of these, one of the hickories, the pecan, is the only species which has so far been developed by cultivation as to become of importance for the production of an orchard product.

The timber of the pecan is less valuable than is that of most other hickories and is in commercial use only as second-class material. However, it is the most important species of nut-bearing tree in the United States. Its native and introduced range includes the fertile lands of the plains of practically the entire southeastern quarter of the country. It is neither an upland nor a wet land tree. It is not found in the mountainous sections, nor, to any important extent, south of Middle Florida.

Several of the accompanying photographs illustrate the beauty of pecan trees both individually and in orchard or highway avenues. The immense size of one tree illustrated proves that under favorable conditions the pecan is one of the largest growers of any species east of the Rocky Mountains. It also suggests the great age which it may attain. When photographed in 1909 this particular tree measured 18 feet 3 inches in circumference at breast height. It was situated near the Mississippi River, at Hohen Solms, Louisiana, twenty-eight miles south of Baton Rouge.

With very few exceptions there are no named pomological varieties of any other native nut now being propagated. So far as these exceptions are concerned, it is probable that fewer than one hundred budded or grafted trees of such varieties are yet of bearing age, and of such as have attained the age at which fruit might be expected, exceedingly few have borne in paying quantities for any number of consecutive years. Therefore, with reference to the planting of native nut species for profit, the truth of the situation is simply this: In the ordinary course of events, with the exception of the pecan, years of experimentation in the testing of varieties and in a study of their cultural requirements must be gone through before any native species of nut-bearing trees can be planted in any part of the United States with a



A BEARING ORCHARD OF PERSIAN (ENGLISH) WALNUT TREES

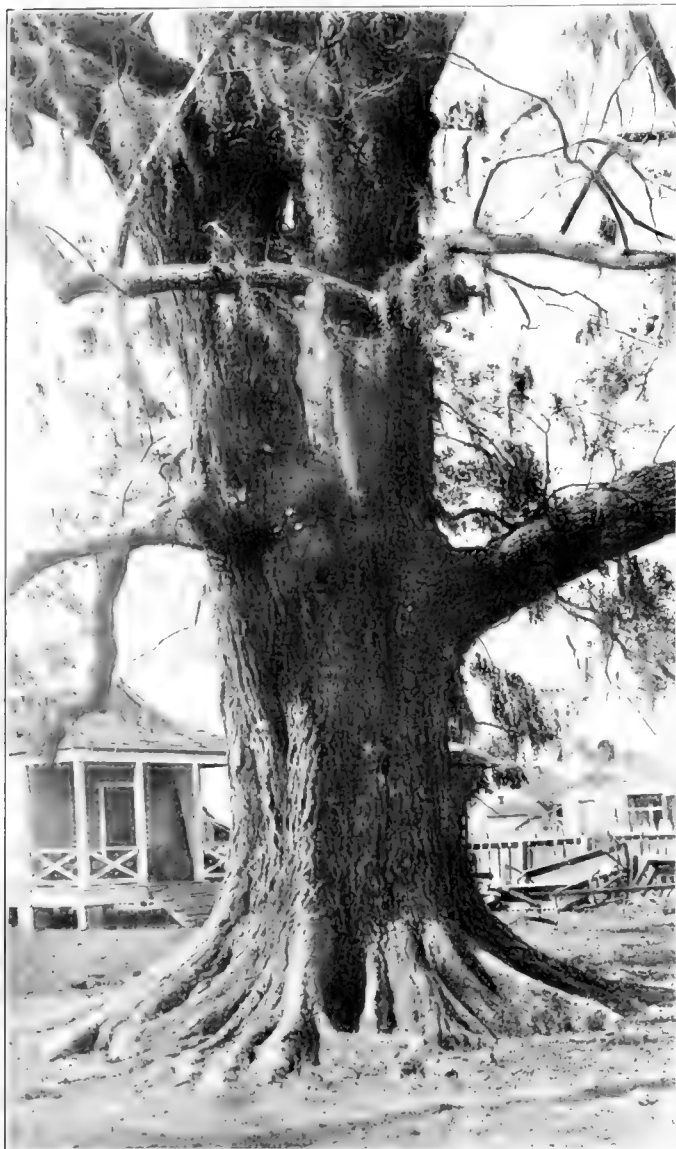
The trees in this orchard in Bucks County, Pennsylvania, are thrifty, seemingly entirely hardy where situated, and as a whole are fairly productive. Being seedlings they vary greatly in varietal characteristics; some bear heavily while others yield very light crops; the nuts of some are quite desirable, but from others they are of little value. Trees of this species should be budded or grafted on some hardy stock. Just now the American black walnut (*J. nigra*) is believed to be the most generally desirable as such stock.

certainly of commercial return from nuts alone which would be comparable with that of many other crops which already are upon a well-established commercial basis in the same parts of the country.

With reference to two of the foreign species of nuts which have been introduced, the situation is quite differ-

neither species can yet be recommended for general planting.

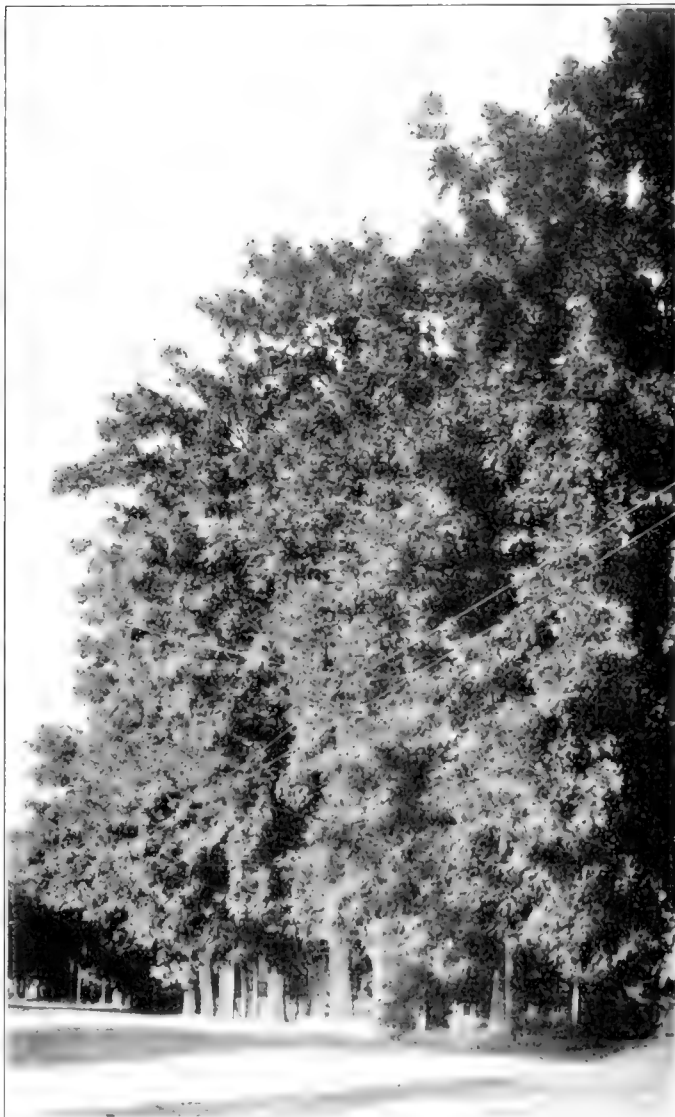
The proper place for such partially improved species, as are most of the native nut producers at the present time, is that in which they may be used for more than the single purpose of nut production. Most of the species of the botanical family *Juglandaceae* to which the walnuts and hickories belong, are slow growers, and as such, are objectionable to the average planter. In answer to this, it may be said that among trees, slowness of growth is invariably associated with longevity of tree and its value when cut as timber. Also, when due pains are taken, it is possible to select species which are ex-



A MONSTER PECAN TREE

This tree, growing in the rich alluvial soil of Louisiana, near the banks of the Mississippi River, thirty miles south of Baton Rouge, measured 18 feet 3 inches in circumference at breast height when photographed in 1909. The size and condition of this tree and of hundreds of others of nearly equal size in the same section should dispel any fears that the species is not long-lived, or that it is not a large grower. A larger tree, measuring 23 feet 9 inches in circumference at breast height, was photographed near Webbers Falls, Oklahoma, in 1909. Avenues of such trees along the Lincoln Highway would be exceedingly impressive and appropriate.

ent. In order of commercial importance of the nuts now grown in this country, two foreign species, the Persian (English) walnut and the almond stand second and third, respectively, the pecan, which is an American species only, being first. With these exceptions, the foreign introductions are all in the experimental or test stage, and while possibly the European hazel (filbert) may now be making a strong bid for commercial recognition in the northwest, and the pistache in parts of California,



CALIFORNIA BLACK WALNUT

These trees are used for street planting on the Pacific Coast. This species is of little value for nut producing purposes, but is very valuable for its timber. It makes an excellent stock upon which to graft the Persian walnut. So long as nut trees are in a healthy condition they are not necessarily too large for top working.

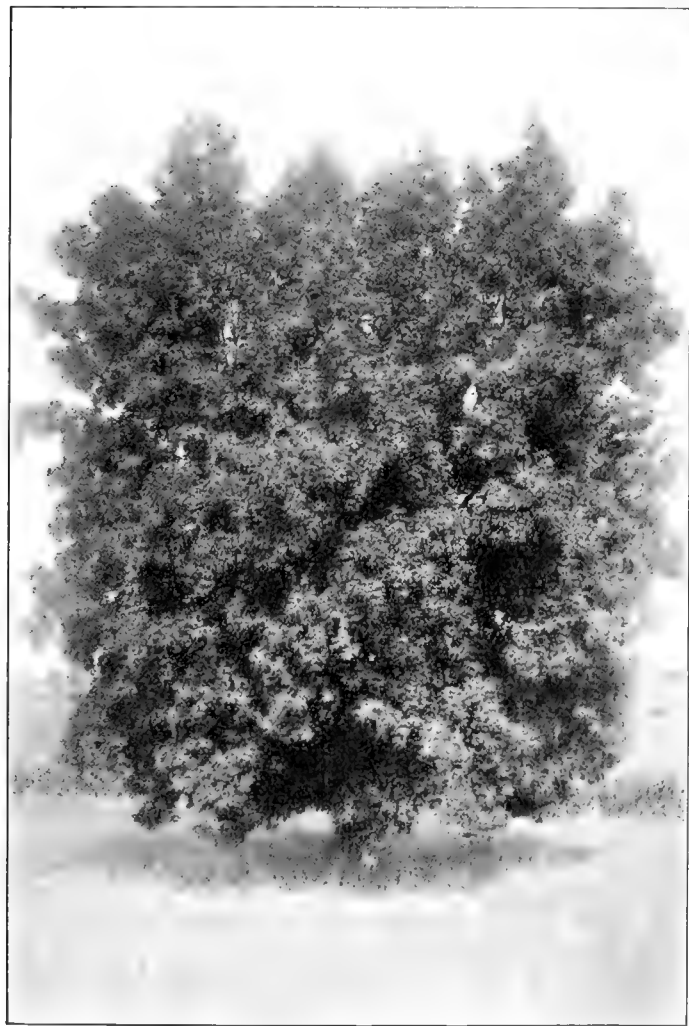
ceedingly satisfactory in the landscape. Several of the accompanying photographs illustrate the individual beauty of selected nut trees and some show their effective use in the landscape.

Foresters are now advocating the planting of trees in

waste places in the country, especially about farm buildings. There are, perhaps, no conspicuous waste places with a greater aggregate area than the strips along the public highway. In certain foreign countries, the highways are planted to fruit trees and the right of harvest awarded to the highest bidder. The revenue so obtained goes a long way toward keeping the highways in good condition. It is possible that this practice may sometime be introduced into the United States, but until public sentiment is radically changed the planting of fruit trees along the highways cannot be expected to yield any satisfactory returns to the public. The experience of Dr. Robert T. Morris, of New York City, who planted cherry trees along the public road past his farm in Connecticut, is typical of what under present conditions might be expected in any part of the country. When the cherries were ripe, automobile parties came for many miles to pick the fruit, and when that in the highway was gone, the cherries from the nearby orchard were taken. In both cases, the branches were broken down and the

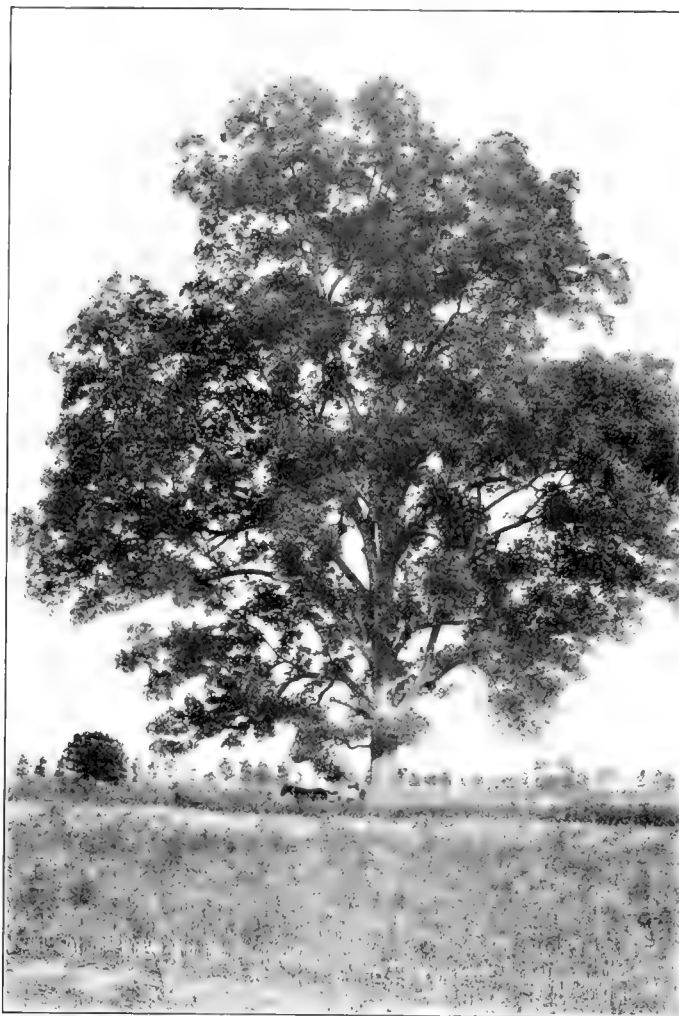
trees left in badly mangled condition. Dr. Morris then tried nursery-grown and expensive evergreens, but on Sundays, automobile parties came again with spades and shovels and dug up the trees.

The ratio of population to tillable land in this coun-



A PIGNUT HICKORY

The hickories are not commonly looked upon as belonging to the ornamental group, but for density and luxuriance of foliage, symmetry of form, and general beauty, it would be difficult to imagine a more perfect specimen than is this tree. The hickories are commonly regarded as being slow growers, but they are quite lasting and valuable when once mature. The nuts of this species often compare favorably with those of the shagbark hickory in character of kernel. This is one of the hardiest of the hickories, and altogether should make one of the most valuable trees for highway and home planting beyond the range of the pecan.



THE PARENT TREE OF THE BUTTERICK VARIETY OF PECAN

This tree is situated on the Illinois side of the Wabash River, northwest of Evansville, Indiana, at a latitude slightly less than that of Washington, D. C. This tree is typical of the pecan species as it is found in nature near its northern limits. It and other varieties originating in the same general section bear bountiful crops of choice nuts. Farther north pecan trees make good tree growth but are uncertain as to bearing. As far as can be seen there is no reason why the pecans should not wisely be planted along the highways and about the home grounds as far north as Southern Michigan and New York State. Occasionally, crops of nuts might be expected from even the most northern planted trees. In middle Indiana and Ohio trees should do somewhat better, bearing not infrequently. In Southern Indiana and other sections of fairly comparable climatic and soil conditions, especially along the Atlantic Coast from the District of Columbia to New Jersey, there is no apparent reason why this should not become one of the most commonly planted shade and ornamental trees.

try is not such that, for a long time to come, the American people as a whole will be pressed into the using of highway land for the production of crops or into respecting the right of the public to harvest such crops as might be grown in its highways. Therefore, for the present, except in densely populated or in more than ordinarily well regulated communities, it would be useless to advocate the planting of ordinary fruit trees along the public roadways.

Irrespective of the possible value of their crops, fruit



NATIVE PECAN TREES IN A MEADOW

These give shade for stock and yield a nut crop at the same time. Not infrequently such trees bear a bushel or more of nuts worth at least ten cents a pound, or a minimum of \$1.00 a bushel. It is not unusual for single trees in the open to yield two bushels or more of nuts which readily bring twelve to fifteen cents a pound.

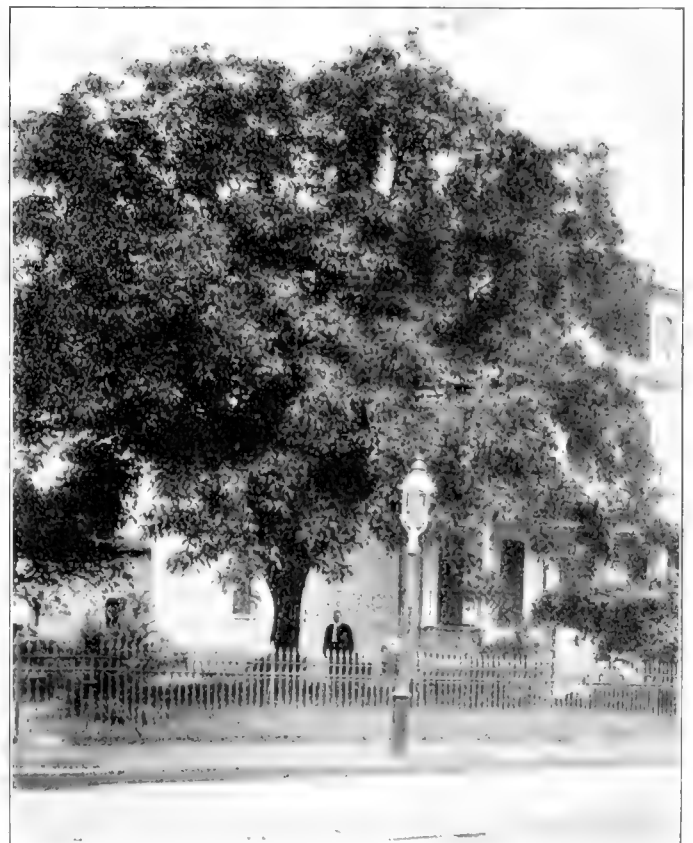
trees of most species are both too small and too short-lived to be suitable for highway planting. With nut trees, the situation is entirely different. The native walnuts, most species of hickories and the American beech are large-growing and long-lived trees. In addition, they are capable of withstanding severe temperatures; they are tough and strong and not liable to injury by storm or while being climbed by ordinary persons; and they readily adapt themselves to a wide range of soil, moisture and climatic conditions.

Ordinary species of nut trees cannot be recommended for the dual purpose of timber and nut production, as, for the former purpose, the trees should be planted close together in order to induce length and straightness of trunk with a minimum of top or bearing surface, while for the latter, they should be planted in the open and given space for the maximum development of bearing surface and a minimum length of trunk. The great demand for hickory in the making of axles, wheels and other vehicle parts and handles for tools, and for walnut in the manufacture of furniture and gun stocks makes it not only possible but common practice to use these woods in short lengths. Therefore, both species planted along the highways and in other waste places might profitably be converted into timber upon reaching maturity, if their crops of nuts should prove to be of small commercial value.

The butternut, *J. cinerea*, is less a symmetrical grower than are the black walnuts. The timber is less valuable and the nuts are cracked with greater difficulty. Nevertheless, it is the most hardy of any native species of *Juglans*. Its kernels are rich in quality and of a flavor more pleasing to some persons than that of any other nut. Cracking the native butternut and marketing the

kernels affords the rural people in many sections a fairly profitable means of employment during the winter months. Its native range extends farther north than does that of either the eastern black walnut or the shagbark hickory, *Hicoria ovata*, and is considerably beyond that of the shellbark hickory, *H. laciniosa*. Therefore, in view of its hardiness, and the merit of its kernels, it is well worthy of consideration for planting in the most northern parts of the country.

The black walnut of the Southwest, *J. rupestris* is one of the sturdy, graceful and durable species of that section. The nuts are seldom of sufficient size to be of commercial value. The California black walnuts, *J. californica* and *J. hindsii*, fall into about the same class as does this species in respect to the points mentioned. So far as the planter is concerned, the main differences are those of adaptability to different sections. Under favor-



A PERSIAN (ENGLISH) WALNUT

This particular tree, by a residence on Wisconsin avenue, Washington, D. C., is very satisfactory as a producer of shade and ornamental effect, and in addition, it yields fair crops of nuts. Similar trees are by no means uncommon from Washington northward to Connecticut and west to Southern Michigan.

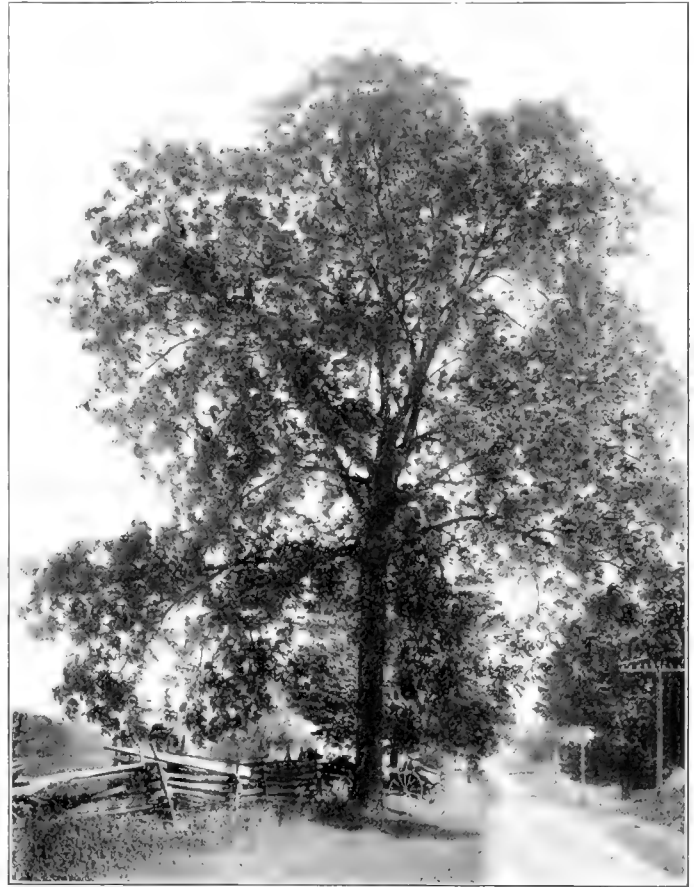
able conditions of soil, moisture and climatic environment, all are capable of rivaling the eastern black walnut in such points as size, as beauty of tree and in size of crops.

Were it not for the blight which is now making practically a clean sweep of destruction over the eastern states, wherever the native chestnut is found, the American chestnut *Castanea dentata* would certainly be entitled to leading consideration as a highway and ornamental tree. Unaffected by blight or other disease, it is one of the largest growing and most graceful species in the eastern United States. The European chestnut is nearly as susceptible to this blight as is the American species. The chestnuts from eastern Asia now appear to be sufficiently immune to offer a practical solution to the situation by their introduction into this country. However, they commonly lack the sweet agreeable flavor of the American species and need hybridizing in order to improve their quality. This the Federal Department of Agriculture is now doing, and in due time there may be something to offer in ample quantity which will make a satisfactory substitute for the native species. Exclusive of the Asiatic species and the government hybrids, there are now no available species which can be recommended for planting in the blight affected area, and these should be planted only for test purposes.

The pines referred to at the outset of this article as being important nut producers are all western species found only on the mountains and nowhere under cultivation. There are at least fourteen species. Representatives are found in most of the Rocky Mountain states. The most important species is *Pinus edulis*. It is found at altitudes of from five to seven thousand feet in the mountains of New Mexico, Arizona and northern Mexico. In favorable years, the seeds are gathered in enormous quantities under the name of "pinons," or according to the Mexicans, "pinyonies." The nuts are rich in flavor, but small and difficult to extract from the shells. They are not well known in the eastern market, but in the Southwest they form a highly important article of food for the Indians and Mexicans. These pines are exceedingly slow growers and not of graceful form. They could scarcely be considered for highway planting, except at the altitudes to which they are common, and then, probably, only where some more satisfactory shade trees would not succeed.

Among all American species of trees, it is probable that in a combination of beauty, longevity, strength and hardiness, the American beech *Fagus grandifolia* is unexcelled. Although commonly looked upon as being a northern species, its range extends south to northern Florida and west to the Trinity River, in Texas. It is most familiar as a clean-barked, spreading tree, with low head, and a height of from fifty to sixty feet. However, its form depends largely upon environment. The writer has seen it in the bottoms of southwestern Georgia, in common with the magnolia, growing to a height of from seventy-five to one hundred feet and with trunks of two feet in diameter extending upward in a manner which, with regard to height and uniformity of size, com-

pared favorably with the long-leaf Georgia pine. The nuts of the beech are rich in quality and of excellent flavor, but owing to their small size and the great difficulty attending the extraction of the kernels, they are not ranked as being of direct importance for human food.



A TYPICAL NATIVE BLACK WALNUT

This species is one of the most rapid growing of any of the native timber producing trees. Its range has been extended until it now covers practically the entire United States with the exception of the sections representing the extremes of latitude, altitude, moisture and dryness. It is very useful in the landscape, and in the number of bushels of nuts produced it was the leading species of the country when the last census was taken.

Their principal use in this country is as a mast crop for turkeys and swine, for which they serve a most useful purpose. Crops which can be used in this manner to good advantage, thus practically obviating the problems of harvesting, storing and marketing, are certainly well worth thinking about in these days of labor scarcity.

There are few large sections of the United States adapted to the growing of trees to which some nut-bearing species is not suited. Most species of nut trees are as capable of producing shade and ornamental effect, and are as hardy and lasting as any others which might be mentioned. In addition, they produce an edible product which is entering into the list of staple food products with great rapidity. The present scarcity of meats and the consequent high prices are compelling the substitution of other products. The superiority of nuts over practically all other products which are available, as substitutes, scarcely needs argument. Already nuts are being pressed into service as rapidly as production permits and perhaps more so than prices and comparative food values justify.

Singularly enough, the oldest and most thickly populated portion of the country and that within which the greatest number of edible species of nuts are indigenous, is today practically without pomological varieties for planting. Within this area individuals have made tests of species and varieties for many generations, yet little progress has resulted. The obvious need is for further test on a large scale. A better opportunity for the making of such a test could scarcely be imagined than that of highway planting.

Pomologists are firmly recommending the exclusiveness of budded or grafted trees. But this advice applies only to orchard planting for purposes of commercial production. Until more and better varieties are known and their merits established, that portion of the country lying north of the pecan belt and east of the Rocky Mountains must await the development and trial of new varieties. Seedlings must be planted in large numbers from which to select varieties. The process is too slow and the percentage of varieties which may be expected to be worth while too small for it to be possible for the individual to make much headway during an ordinary lifetime. Our present system of national highways by which all parts of the country are being connected is perfecting the opportunity. The general planting along these great national highways of elm, oak, poplar, tulip, cedar, hemlock, magnolia, pine or any other species which, unless cut, are capable of producing no crop other than that of shade, would hardly be in keeping with the present need for utility. It would be giving a questionable degree of thought to the welfare of future generations.

To the list of nut trees as utility trees there might be added the sugar maple, and certain species of prolific-bearing oaks. The former could be drawn upon for the making of syrup and sugar, and the acorns from the latter could be put to good use as hog and turkey feed. In wet sections, willows might prove useful from which to cut material for furniture or tying bundles.

A way of overcoming the objection of slow growth of some of the nut species might be the alternate planting of quick-growing species which would furnish shade in a minimum length of time and which could be cut for pulp or other purposes by the time the nut trees reach maturity.

A practical objection to highway planting of nut trees is that unless cared for, such trees are in danger of becoming breeding places for disease and insect pests which would quickly spread to nearby orchards. However, such planting in numbers too small to be worth caring for is not to be considered. Already the country is agreed that the maintaining of the middle of the road in such condition that it can render maximum service is a paying investment. The suggestion here made is only as the next step in highway investment. It is a proposition to make more comfortable and attractive the present system of roadways, and at the same time to help develop new varieties of nut trees for orchard planting. Unless new varieties are soon to become available, a large part of the country will find itself de-

pendent upon outside sources for its principal substitute for meat and its main supply of vegetable fats.

A little thought should be able to work out a sound program for the planting of utility trees on practically every highway in this country.

THE TOTEM TREE

By H. E. Zimmerman

A Civil War veteran of Union Springs, New York, made this unique totem tree, which is eighteen feet high and six feet in circumference. Thirty-four figures are



carved on it. Unlike the idea in an Indian totem pole, this was not intended as a family tree. The gentleman made it after his own fancy, spending two summers in decorating it with animals, birds, portraits and other figures. At the top he built cute little bird houses, and to heighten the artistic (?) effect, he painted the objects in a variety of colors.

THE THRUSHES

(Family Turdidae)

By A. A. ALLEN

Assistant Ornithologist, Cornell University



IN the noisy parks and gardens of the large cities, in the silent spruces of the mountains, from the steaming forests of the equator to the rocky coasts of the Arctic Sea, there is always a bird of the thrush family to welcome the traveler. In the cities it is the robin, the bluebird and the wood-thrush; in the woodlands, the veery, the hermit and the olive-backed species; in the far north, the wheatears, and in the tropics the solitaires and the "thrush-robins." When we make the term thrush broad enough to include the ground thrushes, the accentors, the redstarts, the nightingales and the chats, of the Old World, the family includes between five and six hundred species, but of these, only about 240 are true thrushes. These are widely distributed throughout the world, eighty of them being confined to the New World, of which a dozen species are found north of Mexico.

As a family, the thrushes are medium-sized birds, usually under twelve inches in length, with strong wings and legs and with bills slightly notched near the tip and supplied with strong bristles at the base. They are uniformly colored, rather than streaked, the majority brownish or grayish, although blues, yellows, or even reds are found in the plumages of some. The underparts are white or at least lighter than the backs and, in typical species, are more or less spotted. In species having unspotted breasts, the young in their juvenal plumage

show the spots that have been lost by the adults, as with the robin and the bluebird, interesting examples of ontogeny, for the individuals pass through the stages by which the species have progressed in the course of their evolution.

But it is not for the brilliancy of their plumage that the thrushes are noted, it is for the richness and beauty of their songs. The world over, some member of this family surpasses all others in the appeal which it makes to the human ear. In Europe, it is the nightingale, in eastern United States it is the hermit thrush, and in the West it is the solitaire. The wonderful songs of the mockingbird and the thrasher, discussed last month, appeal to us by their marvellous technique, but the songs of the thrushes by their depth of feeling. Listening to the mockingbird, one is thrilled; listening to the hermit thrush, one feels exalted.

Except during the nesting season, the thrushes travel in scattered flocks, frequenting the borders of woodlands but coming into gardens if they can find food. During the spring and summer, this consists almost entirely of insects and worms, but during the late summer and fall, the various wild fruits form an ever increasing percentage. Gardens, where the dogwoods or the Virginia creeper grow, are sure to attract the passing flocks of thrushes in late September or October, and in the South, the mistletoe and holly sustain some species through-



A HOT DAY IN BIRDLAND

The veery is sheltering its young from the hot rays of the sun. The veery can be told from the other thrushes by the fewness and faintness of the spots on its breast.



THE FIRST TIME OUT

Young blackbirds just out of the box—they seem somewhat alarmed at the bigness of the world. Notice the spotted plumage of the young as compared with that of the adult bird.

out the winter. The robin, the bluebird, and the hermit thrush remain in Southeastern United States and the solitaire and the varied thrush in the Southwest, but the veery, the olive-backed, gray-checked and the wood



EVERYWHERE A FAVORITE

Except with the gardener, who is unwilling to lose the toll of cherries or berries which is exacted in payment for the insects destroyed at other times of the year. The robin is the commonest bird in the United States and has increased more rapidly than any other native species.

thrush continue their journeys to Central America and Northern South America.

Of all the thrushes the robin is, of course, the best known, but in coloration it is quite an aberrant member of the family. It was christened the "robin" by the early settlers because of its general resemblance to the European robin, although the latter is a much smaller bird. It was probably originally a forest dweller, as it still is in some places, but like its European cousin, it has adapted itself to human occupation of its haunts and now builds its nest wherever it can find a sheltered ledge about the house. Its numbers have increased probably more than those of any other native bird in the United States so that today it is regarded as the most abundant species throughout the country. It is beloved by everyone except the gardener, who is unwilling to lose the toll of cherries, berries or grapes in payment for the insects destroyed at other times of the year. It may well be, however, that as the robin increases and the native fruits give way before the cultivated varieties, the robins will become a great nuisance, for fruit they must have, and with no native fruit to satisfy their appetites, the cultivated varieties must, of necessity, suffer. It is a wise plan, therefore, to make provision for the increase of robins and other thrushes by extensive planting to furnish natural food for them. Not only should individual agriculturists do this, but the States, in planting along highways, in parks and reservations,

should include many trees of mulberry, mountain ash, wild cherry or even the sweet cherry to provide for these beneficial birds, to furnish the much needed fruit, and thus help protect the cultivated varieties in the vicinity.

The nest of the robin and indeed that of most other thrushes is a rather bulky structure made of grasses and straws, lined with finer grasses, and having an inner layer of mud. The band of mud across the breasts of all female robins for a short time in the spring is made when the bird is shaping its nest, for when the nest has been roughly plastered, the bird gets into it, as if to incubate, and then by turning around and around, shapes it and makes it perfectly symmetrical. Three to five blue eggs are laid, which require about two weeks to hatch. The young remain in the nest another two weeks so that inside of a month the nest is again empty and ready for a second brood. The same nest, if in good condition, is used for the second brood and, indeed, if it is in a sheltered spot, again the following spring, merely being repaired with enough new material to make it strong.

When the young are able to shift for themselves, they often congregate every night in large flocks at a common roosting spot, perhaps led by the old males. By fall, these roosts, which are usually in a dense swamp or in a clump of oaks or other thick foliaged trees, are very large, containing thousands of birds.

The immature plumage of the robin, in which the breast is orange-brown spotted with black and the back



NOTICE THE SPOTS

These are young robins and in their juvenal plumage show a color pattern through which the species has passed in its evolution. All true thrushes are spotted in the immature plumage if not in the adult.

brownish-gray spotted with rusty, is worn until September or October, when it is replaced by the plumage of the adult. Males and females are colored alike but it takes several years to acquire the rich chestnut breast

and black head of the adult. Females are inclined to be somewhat duller than males, but this difference is more one of age than of sex, and vigorous, mature females are brighter than young males. The western robin differs from the eastern bird principally in the absence of the white tips to the outer tail feathers.

Another aberrant member of the thrush family is the familiar bluebird. With its blue back and chestnut breast, it is indeed one of the most beautiful birds of the countryside and well worth every effort to increase its numbers. It is quick to respond and in many localities has greatly increased because of the nesting boxes which have been put up for it. Indeed, in most places, it has now regained the numbers lost in the devastating storms of the winter and spring of 1911 and 1912 when thousands were starved and frozen, and is once more a familiar bird. A similar catastrophe occurred also in 1895 when so many were killed that they did not regain their hold for over ten years.

The female bluebird is much duller than the male and the young are grayish, obscurely spotted above and below, and showing blue only in the wings and tail.

The blue eggs, so typical of the thrush family, have, with the bluebird, become very pale, perhaps owing to its hole-nesting habit, for the majority of birds that nest in holes lay pure white eggs.

The most suitable nesting box for the bluebird is one

Both the robin and the bluebird spend the winter in southern United States and are among the first birds to push northward in the spring, arriving in northern



AN EGG IS AN EGG TO A VEERY

The speckled egg, that of the parasitic cowbird, is cared for with equal solicitude to one of its own. The veery nests on or near the ground in moist woodlands.



MORE SPOTS

The wood thrush has more conspicuous spots on its breast than any other thrush in this country. Notice the paper napkins with which this bird has endeavored to disguise its nest—"camouflage" in birdland!

that measures 5x5x8 inches inside with a two-inch hole four inches from the bottom on one side. It is best placed on a pole in the garden or above a fence post, six to ten feet from the ground, in bright sun or light shade.

United States early in March or even in late February. Occasionally individuals of each species find food and shelter and spend the winter in protected spots as far north as New York or New England.

The western bluebird differs from the eastern in having the throat blue, instead of chestnut, and in having a brownish spot on the back. The mountain bluebird of Alaska and the higher Rocky Mountains has the entire underparts light blue, but is quite similar in habits to the other species.

After the robin and bluebird, the next thrush to arrive in the spring, while the leaves are still bare, is the hermit thrush. Being of a retiring disposition and frequenting woodlands rather than gardens, it is less often seen, although during cold wet spells, when food is scarce, they venture close about the house and come to feeding shelves with the chickadees and juncos. The hermit is a typical thrush with uniform dark brown upperparts and whitish underparts with dark spots on the fore breast. The breast is less spotted than that of the wood thrush and more so than that of the veery, and it is easily distinguished from all of them by its rufous tail which it has the habit of lifting slightly when it alights or when it utters its call, a low *chuck*. It nests in the hills and mountains of northern United States and Canada above an altitude of 1,500 feet, placing its nest of mosses and grasses on the ground beneath a sheltering branch.

It is only on its nesting ground that its full song is heard and there usually early in the morning, toward dusk, or even in the dead of night. Then, when the

woodland is silent save for the occasional ecstatic outburst of an ovenbird, hurling itself above the trees, the clear tranquil notes of the hermit will move even the most stolid. Beginning low, like the distant dripping of some cool spring, the singer runs lightly up the scale



A BLUEBIRD IN THE ORCHARD

Bluebirds and apple blossoms are always associated. It is well that they should be—well for us, well for the birds, and well for the orchard.

until it touches the highest chords; a still higher note, a trill, and then silence. Soon the low, liquid notes are heard once more, as the bird moves nearer, and the song is repeated again and again, not hurriedly, but with all the leisure and solemnity that a finished production requires. All nature is hushed and seems to listen to the voice that expresses so well the purity, the serenity, the mystery of the twilight in the forest.

The wood thrush and the veery are but slightly inferior to the hermit in their songs and in most places are much better known, for they often take up their abodes in city parks or about shaded lawns. The veery requires moist woodlands with undergrowth in which to place its nest, but the wood thrush is often content in an orchard or along shaded streets like the robin. The song of the wood thrush is somewhat like that of the hermit, but the phrases are shorter and the notes less clear. The veery's song, on the other hand, is quite different. Rich and clear like the songs of the other thrushes, it consists of a single continuous warble like the syllables, wee-o, wee-o, wee-o, given on a descending spiral. The veery has fewer and less conspicuous spots on its breast than the hermit, but the wood thrush has its clear white breast covered with large dark spots. Moreover, it can be distinguished also by the fact that its head is much brighter than its back. The veery winters in northern South America, but reaches the northern United States the last of April, somewhat earlier than

the wood thrush, although the latter winters from southern Mexico to Central America.

The olive-backed and gray-cheeked thrushes are less well known than the others. Wintering in South America and nesting in the coniferous forests of the North, they are seen in the United States only as transients in the spring and fall, except in the mountains of New York and New England, where they nest at altitudes over 2,500 feet. They are both uniformly darker than the other thrushes and can be distinguished from each other, in good light, by the fact that in the olive-backed, the eye ring and cheeks are washed with buffy. The sub-species of the gray-cheeked thrush which nests south of the St. Lawrence, is somewhat smaller than the northern bird and has been named the Bicknell's thrush.

The Townsend's solitaire of the Rocky Mountain region is similar to the hermit thrush in its habits, living alone in the coniferous forests whose silences are broken only by the beautifully clear notes of this bird. The solitaire is a dark gray bird, about the size of a bluebird, with a white eye ring, white wing bars and white tips to the outer tail feathers. It builds a rough nest under a shelving bank and, unlike the other thrushes, lays grayish-white eggs spotted with brown.

The varied thrush is a strikingly marked bird of the Northwest, ranging in summer from Alaska to the mountains of northern California and wintering from Washington to Lower California. It is a bird about the size of a robin, rusty brown beneath, the throat crossed




AN INSECT ELIMINATOR

A box full of bluebirds will do a great deal toward ridding the garden of pests. The box should measure 5x5x8 inches, with a 2-inch hole four inches from the bottom on one side.

by a blackish necklace, and dark bluish-slate above. It is ordinarily a rather shy bird, but on its winter journeys it frequently comes into gardens where it can find the berries of the California holly or of the manzanita.

EDITORIAL

HOW WE STAND FOR EFFICIENT STATE FORESTRY

N editorial in AMERICAN FORESTRY for June, 1917, stated the facts regarding the recent reorganization of the forestry department of Vermont. It told how the state forester, a capable, experienced man with long recognized ability and a first class reputation as an efficient forester, resigned rather than be legislated out of office. He did so because, like many another good citizen, he found it impossible to serve the best interests of the public and at the same time comply with the wishes of certain influential people of the state.

This frank, straightforward editorial expression regarding a situation, in which Vermont has no monopoly, has inspired some of the newspapers of the state to not only continue their attacks upon the former state forester, but to challenge the integrity and the independence of the American Forestry Association as well as implying that the editorial was published at the behest of the former state forester, who is now employed in the United States Agricultural Department.

Such charges are not in themselves worthy of answer, but they do suggest a further statement clinching the argument which was previously made.

One newspaper says: "It is about time for the head of the Forest Service of the United States, or the Secretary of Agriculture, to tell their underlings to refrain from political activities."

This is amusing in view of the well-known fact that for the past twenty years the American Forestry Association has exerted itself with considerable success in building up and protecting efficient and non-political state forestry departments, in charge of trained experts, who know and understand what forestry is, and who mould and develop a progressive forest policy for the states which employ them.

The Vermont newspapers need not assume that the association has singled out their state for special attention. Far from it. In many states in the last few years efforts have been made to overthrow efficient forestry departments which have become popular and important parts of the state machinery. These efforts have been inspired primarily by selfish motives. The usual method by which control of these efficient departments has been sought has been by reorganization and consolidation with other departments under the guise of economy. The real end sought was the placing of the trained and efficient heads of these forestry departments under political direction and dictation.

Efforts similar to those which succeeded in Vermont

and in Wisconsin have been met and defeated in New Hampshire, Maryland, Minnesota and Oregon and have been prevented in other states by the knowledge that they would be vigorously opposed.

Efficiency in state as well as national government departments, where technical men are required, demands the substitution of the trained executive for the political appointee and the elevation of public service into a career sufficiently stable to attract men of real ability.

It is apparent that neither state nor national forestry can measure up to the demands made upon it without the adoption of a system by which men of merit will be retained without political interference. The National Forest Service has such a system and much of its success is due to it. States, too, must have it if their forestry administrations are to be successful and if they are to give their citizens the kind of state forestry management best suited to their needs.

How shall an efficient, non-political forest administration be supported against the onslaughts of private greed and the hostility of the believers in partisan management? The employees upon whom rest the burden of the work are comparatively helpless to defend themselves against attacks which are based upon the assumption that anything they say is inspired by self interest, and that their real purpose is not so much to serve the public honestly and faithfully as to hold their jobs. The average citizen is still of the opinion that most state jobs are sinecures and that the appointments are made and salaries paid as rewards for political work or influence.

As a matter of fact, men of equal training, education and ability to those required for the successful administration of technical positions under state and national governments can and do command salaries, when in private employ, largely in excess of those paid them in public service.

In calling public attention to the outcome of the struggle in Vermont the AMERICAN FORESTRY Magazine published facts of common knowledge and what it did was fully in keeping with the policy of the Association in striving for the best possible forestry administration for every state in the Union. Its utterances were not inspired by any government or state official or by the former forester of Vermont, and it will continue to speak plainly and forcibly in favor of the establishment, continuance and protection of competent and efficient forestry departments, as it has done in the past, with the knowledge that it has the full support of its members and of all who believe in good government!

BUILDING AN ATMOSPHERE OF STABILITY INTO THE HOME

BY RAWSON W. HADDON

A RECENT commission has decided that not more than a fraction of the people of one large American city can be called really native American, and that the rest—nearly ninety per cent of the total population—remain so purely and hopelessly alien that immediate steps were thought necessary to bring this foreign population, or at least some part of it, into touch with our own American ideals in more effective ways than have yet been attempted.

While no statistics are available in the case of our suburban population, carefully arranged figures would probably show the population there less migratory than one might suppose.

It is certain, however, that until very recently the typical suburban house has carried with it no suggestion of stability or permanence. The average house within commuting distance of large cities has been, and still is, in appearance, an extremely haphazard and informal affair, more suggestive of hurried erection than of anything else and entirely lacking in those marks of long residence which one sees, or unconsciously feels, in the recent suburban developments outside of London or other English cities.

The American suburbs are in many instances older than the English ones. It is not a matter of actual occupancy at all, but of architectural design. And while

English architects seem always to have known instinctively how to put into their work a feeling of dignified stability, the ability to put a similar feeling into their designs is one that has but recently been acquired by architects in the United States.

But some of our architects undoubtedly *have* the knack, and it would probably puzzle most visitors to Cranford, New Jersey, to explain why the Bush house, built only a few years ago, possesses so subtle and definite an appearance of age and carries so much more distinct an impression of containing within itself those best traditions of American home life in which its neighbors—even those of undoubtedly greater age—seem most lacking.

The explanation is simple. Mr. Joy Wheeler Dow, the architect of some delightful houses, of which a few have been illustrated in this magazine, has worked out the following explanation which appears in his book, "The American Renaissance."

In an average, modern house of that western type of design which has been widely heralded from time to time as a "new American style" of architecture, Mr. Dow found the following elements suggested:

Moresque Spain.....	10 per cent
Moresque Algiers.....	10 per cent
Moresque California Mission.....	10 per cent
East India	5 per cent
Newly reclaimed land	10 per cent
Chinese Ornament.....	5 per cent
Modern invention, pure	50 per cent
Anglo-Saxon Home	00 per cent

On the other hand, a distinctly homelike looking house of American Renaissance or Colonial design consisted, according to the same analysis, of:

Moresque Spain....	00 per cent
Moresque Algiers....	00 per cent
Moresque California	00 per cent
Mission	00 per cent
East India	00 per cent
Newly reclaimed land	00 per cent
Chinese ornament....	00 per cent
Modern invention, pure	00 per cent
Anglo-Saxon Home	100 per cent

The secret of the Cranford house consists, also, of its possession of that single important



The house of Mr. Charles H. Bush, at Cranford, N. J., looks for all the world as though it might have been put up by one of the "earliest settlers." But it was built only a few years ago. Hollingsworth and Bragdon, Architects.

item, the 100 per cent Anglo-Saxon home atmosphere. And assuming that the house does possess an atmosphere that is a desirable one, the question naturally is, "How was this secured?" This also will be easy, in the present instance, to explain.

For, if you will look back on your own experience, you will probably discover that some one house, one in which you lived or where you visited, and which remains connected most firmly in your mind with the pleasant memories of cheerful home life, was a house somewhere in the country, surrounded by broad fields and great trees—or it may have been a house in a country or suburban village or town surrounded, but to a smaller extent, with the same things.

Certainly, the chances are, it was a frame house, rather large, and there were trees around it and flowers near the walls and down at the road there was a fence. Now, if you are a true American, and possess the memory of that particular house, you may be sure that the memory has been lingering around in your head and has, unknown to you, been standing as your measure of comparison in all your thoughts of what *home* ought to be.

For this reason it will be plain that there is no cause for surprise when you fail to respond to some houses as readily or entirely as you do to others. Or that a grandiose stucco house or an imposing stone one does not measure up to your ideals in the same way that a little white frame house nestled down among autumn tinted leaves and bright flowers will seem to touch certain chords that tell you at very first sight that you *would* be happy in that house, that it would be a home for you and for your children, and—if you look into the matter as far as that (which you should)—a home for your children's children, or at least, some, or one, of them as well, and not simply, as too many houses are, a mere sheltering roof and nothing more.

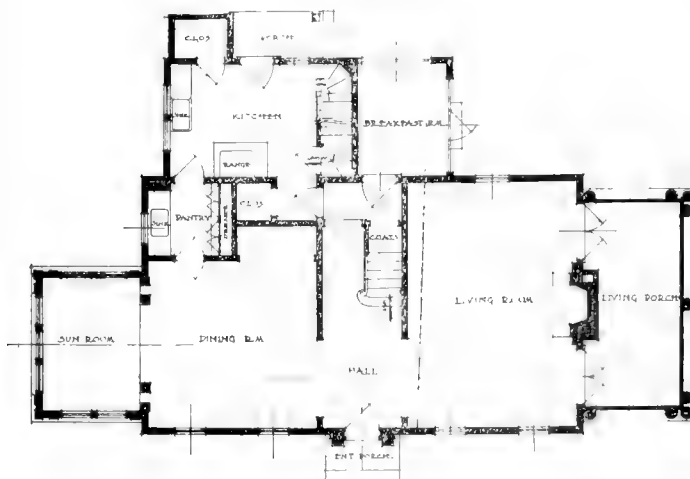
So there are psychological reasons why you, as a real American with a love and respect for good American traditions, must respond to this house in Cranford that I have chosen as an example of how an architect may compel our interest in his work by appealing to mental apparatuses of which we are entirely unconscious.

Our interest, of course, is aroused more by the echo of that house that we knew long ago, but the appeal to it is through the house before us and this house in turn takes on an interest as a "visible memory" of the other one.

Not by the house alone is the interest brought about, but by it in connection with the other details that the architect has arranged: The trees, for instance, and the hedge, and the dormer windows (to remind us of old-time sport in attics) and chimneys that guarantee fireplaces to sit around on winter nights. All these things go to make up the impression and one without the others

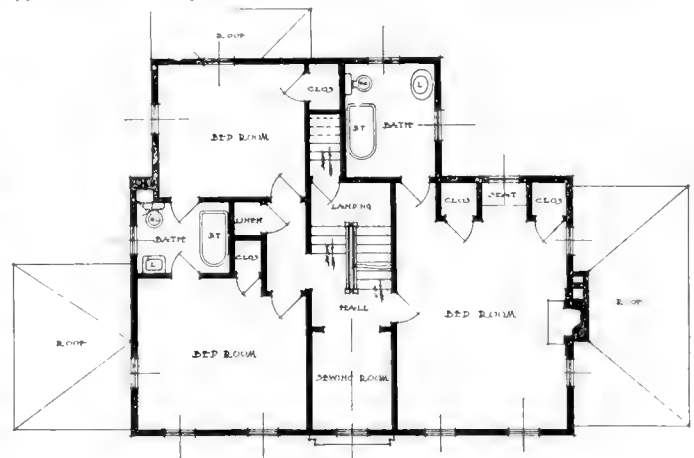


A near view of the door shows us that in order to get Colonial atmosphere it is not necessary to go out with a pencil and rule and make an exact copy of an old example.



FIRST FLOOR PLAN.

First Floor Plan, House at Cranford, N. J.
Hollingsworth and Bragdon, Architects.



SECOND FLOOR PLAN.

Second Floor Plan, House at Cranford, N. J.
Hollingsworth and Bragdon, Architects

would probably appeal to us as little as the stucco house or that "imposing marble mansion" did.

To say that architectural style alone gives the house its atmosphere of stability and of "having-been-lived-in-ness" is as one writer has said, "the veriest punk and rot." Witness the perfectly designed (from an archaeological viewpoint) Colonial houses, or English villas that leave us quite untouched.

One cannot say, for instance, that this Cranford house is Colonial because it has such and such details. You will find none of the favorite Colonial details employed in its making. Rather it is in the elimination of them that the architects have shown their greatest ability. It is that they have made us acknowledge that this house has that "100 per cent Anglo-Saxon home feeling" and not that they have forced us to admire a perfectly designed "Colonial sampler" simply as such or that they have made a design that overwhelms us with its cleverness so that no room is left for consideration of the homelike qualities of the building.

We who belong to the Anglo-Saxon race must bow down to the Latin theory of cities insofar as our business life is concerned. But your true Anglo-Saxon is a country born man with a soul that develops best among trees and fields and flowers and plants.

Naturally, then, the house that suggests these things, and all of them, and the architect who arranges such houses for us, are points toward which we turn in escaping from our life in cities of Latin inspiration.

Therefore, in the final ideal arrangement of our lives, these things are among the necessities to our happiness; a house like the one we knew somewhere a long time ago, a certain number of trees around that house, some flowers, a garden, and a stretch of green, open field or lawn.

In America the house that measures up to our standard is more often a frame one and perhaps, if we were very fortunate in our antecedents, a Colonial frame one.

The Cranford one is Colonial. It is frame. Parenthetically I might add for your information, should you attempt the erection of a similar house, that the clapboards are white pine, the shingles cypress and the frame is spruce.

The grounds are supplied with a certain number of trees, and we have a hedge at the street and flowers and vines in a little strip of garden immediately at the foundation of the house. It is for these reasons that the house interests us and stands out from its neighbors in the possession of that subtle appearance of age and homelikeness.

In your house, if trees are not already grown on the land, they may be transplanted, fully grown, by certain scientific methods of removal and transplantation so that you will not have to wait for years before your shade is an accomplished fact.

I might have added, also (had I not been

too enthusiastically engaged in other interests), that the exterior of the house was painted with especially prepared white lead and linseed oil and that the roof shingles were stained.

You may wonder what the cost of building all this psychological inspiration was. Exclusive of the trees, and gardening, of course, the cost of the house was \$10,000.

You see then, how important to our full enjoyment of life, socially, psychologically and domestically, a proper development and understanding of forestry must be. And how important it is for you, when you build, to have your house designed by an architect who understands it, and who knows the value of white clapboard walls and fences and green trees and shrubs and enough flower garden space to provide just the right amount of bright color—but not too much—to complete the outward representation of the domestic happiness that maintains within.

BOOK REVIEWS

The Development of Forest Law in America, by J. P. Kinney. John Wiley & Sons, Inc., New York.

As chief supervisor of forests, United States Indian Service, Mr. Kinney has been brought into intimate relationship with the forest resources of the country and the great mass of laws pertaining thereto. In this book he has collated a mass of useful information on this subject, the whole comprising a historical presentation of the successive enactments by the Federal Congress and by the legislatures of the states directed to the conservation and administration of forest resources. He has sought to confine himself to a logical presentation of the chronological development of legislation. The field covered includes the preservation of existing resources, the reforestation of cut-over or burned areas and the systematic management of forests for productive purposes. For the sake of completeness he has deemed it wise to include references to a number of laws regarding forest fires, shade trees and other related subjects which were not strictly laws on forest conservation or administration. For convenient reference the author has in most cases given both the date of the individual act cited and the chapter number, and to facilitate a ready finding of the law he has often given the page in the session laws as well. The work is important for all who are in any way interested in forestry laws.

A Nursery Blight of Cedars, by Glenn G. Hahn, Carl Hartley and Roy G. Pierce. Government Printing Office, Washington, D. C.

A Nursery Blight of Cedars is a treatise by Glenn G. Hahn, scientific assistant; Carl Hartley, forest pathologist and Roy G. Pierce, forest assistant, investigations in forest pathology, in the bureau of plant industry of the United States Department of Agriculture. The treatise was originally

published in the *Journal of Agricultural Research* and is republished by authority of the Secretary of Agriculture, with the co-operation of the Association of American Agricultural Colleges and Experiment Stations. It deals with a disease through which nurserymen have for fifteen years lost large quantities of red cedars. To such extent has the damage manifested itself that several of the largest growers have been forced to abandon the raising of trees of this type, despite the fact that the demand for them is sufficient to make their propagation of considerable importance in some of the nurseries of the middle west. The authors of the booklet have conducted extensive experiments in inoculation and treatment of the parasitic growth. The fungus has been obtained from Kansas, Nebraska, Iowa, Illinois and Pennsylvania. Incomplete tests so far made in spraying with commercial lime sulphur solution and Bordeaux mixture have given little indication of value as to control.

Those interested in wood preservation cannot fail to be impressed by a new booklet on "How to Make Farm Timbers Rot-proof," just issued by the Barrett Company. This work treats of the treatment of timbers for general construction purposes, fence posts, shingles and silo staves and foundations and deals with the use of Carbosota creosote oil as a substitute for paint for the checking of decay and because of its qualities for the destruction of germs and insects. Emphasis is placed on the value of creosoted wood for excluding insects and vermin, the eradication of chicken mites in chicken-houses, for keeping ants and spiders away from beehives and for checking the development and spread of disease germs such as those of hog cholera. Detailed discussion is given of the open tank treatment of timbers, the brush treatment, dipping and spraying.

Under the title of "The Sport Alluring," the DuPont Company of Wilmington, Del., has just issued a very attractive book dealing with trapshooting. The book is attractively printed and handsomely illustrated with thirty or more pictures that will be of interest to all sportsmen. In its unfolding of the possibilities of trapshooting the book throws much interesting light on the subject. The book may be had on application.

As a companion to "Handbook of Explosives," the DuPont Company of Wilmington, Del., has issued "The Giant Laborer." This booklet deals entertainingly and completely with the application of explosives to various agricultural and miscellaneous uses. It details the advantages of explosives in land clearing, ditching, drainage work, subsoiling, tree-planting and orchard cultivation. "The Handbook of Explosives" gives full instructions as to the handling of explosives for these and other purposes. Both books may be had on application.

CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY,
CANADIAN SOCIETY OF
FOREST ENGINEERS

On the 31st of August a most interesting meeting took place at Tupper Lake. Dr. Fernow invited a few foresters to meet him there and look over the plantations which were made at Axton by the first Cornell Forestry School between 1898 and 1904. A number of Canadian Foresters went down by motor, Clyde Leavitt, C. D. Howe and R. D. Craig of the Dominion Conservation Commission, and Ellwood Wilson of the Laurentide Company. The Cornell forestry students with Professors Spring and Bentley came over from their camp, Professor Bryant of the Yale Forest School and Professor Recknagel, Forester to the Empire State Forest Products Association and Messrs. Gaylord and Stubbs from Nehasane Park together with Dr. Fernow made up the party. The plantations were thoroughly studied and in the evening a discussion of the best methods of handling cut over lands in the Adirondacks took place. The chief lesson to be learned from the work done by Dr. Fernow, is, as seen by the writer, that indiscriminate planting, just for the sake of planting something, is a waste of time and money, whether done by the State or anyone else. The object to be attained should be carefully considered, trees best suited to the soil conditions should be chosen, seed should be carefully selected, only the very best transplants should be used and these should be as large as can be conveniently handled. Considering the length of time needed to produce a crop of timber and the investment involved anything less than a fully stocked area falls short of the end desired. Ragged, uneven sized stands are a waste of time and money. Probably the only way in which results can be hastened is by planting on the largest possible sized and most vigorous stock. British Columbia and western trees do not seem to be worth planting in the east, Norway spruce has shown that it is an excellent tree for fair to good soils and Scotch Pine certainly does splendidly, and for a first crop on poor and burnt over lands and where quick results are desired has no equal. The planting up of the waste and burnt over lands in the Adirondack Preserve should be continued, but on a much larger scale and some planting plan should be developed and put in practice at once.

One of the most interesting developments in Canada is the change in public opinion in regard to its forest resources. A prominent lumberman and senator, who a few years ago pooh-poohed forestry methods as unpractical, and

thought that timber would grow fast enough to reproduce the stand every thirty or fifty years, now declares on the floor of the Senate that Canada has only enough timber to supply the United States for eight years and that our ideas of our timber resources are greatly exaggerated. Paper manufacturers have stated before the Commission at present investigating their business, that they have only pulpwood enough for fifty years more. It is to be hoped that the public and those interested in timber lands will awake completely to the dangers of the situation and will help to improve the systems of fire protection, force the various provincial governments to reorganize their colonization policies and will eliminate the logging wastes and inaugurate practical and rational silvicultural and planting operations. The Dominion Forest Products Laboratory is doing splendid work along these lines, but we need a real forest laboratory in the open, where questions of vital importance to our forest can be studied out. A few of these may be stated. The best ways of logging and utilizing our different forest types, so as to make the most out of them and at the same time to leave them in the best possible condition for the future. How to handle our burnt over areas, what species of trees to plant on different soils and under different conditions. How best to encourage natural reproduction, how to drain and plant our large areas of swamp lands, and how we can most economically transform our wild forests, containing a large admixture of species of no commercial value, into well stocked areas producing the largest possible number of the most valuable trees and at the same time keep our industries dependent on the forest supplied with a sufficient quantity of raw material at a profitable price. These are some of our most important problems and they should be scientifically and systematically attacked by trained men, for the results would be of untold benefit to the whole country.

The Canadian Forestry Association has obtained a very good moving picture film which will be shown at moving picture houses throughout our forested districts. It shows the beginning and progress of a forest fire, the result of carelessness, and the terrible destruction caused by it. The educational campaign of the Association is progressing favorably and is doing a great deal of good.

In British Columbia the season has been a bad one for fires and anxiety still continues. In Spruce Valley ten lives are thought to have been lost and three camps of the Elk Lumber Company, together with large quantities of logs and

supplies, have been wiped out. The Crow's Nest Valley in Alberta also had a bad fire in the district operated by the McLaren Lumber Company. This was promptly taken in hand by Mr. R. M. Brown, the Forest Supervisor, and Mr. E. H. Finlayson, the District Inspector, who managed to keep the fire under control. It is reported that the fires which took place in Northwestern Ontario earlier in the season were much exaggerated. In Quebec, New Brunswick and Nova Scotia only a few insignificant fires have been reported.

At the auction sale of timber limits by the Province of Quebec, several limits were sold at a price of \$400.00 per square mile. These were along the line of the National Transcontinental Railway about 225 miles northwest of Quebec.

The Quebec Forestry Branch has put a party in the field to study the condition and the amount of growth and reproduction on cutover lands and will soon follow with two other parties.

Mr. R. H. Campbell, Director Dominion Forestry Branch, recently inspected the plantations on drifting sands at Lachute, Quebec, and also the Government Nursery at Berthierville in company with Mr. G. C. Piche, Chief Forester.

Mr. J. H. Cunningham of the Laurentide Company, Ltd., has just completed a very complete and practical adaptation of the Dewey System of Decimal Classification to the needs of the Pulp and Paper industry.

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Forest Education

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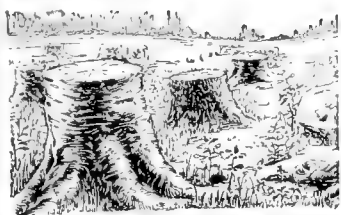
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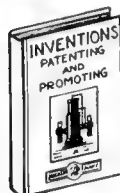
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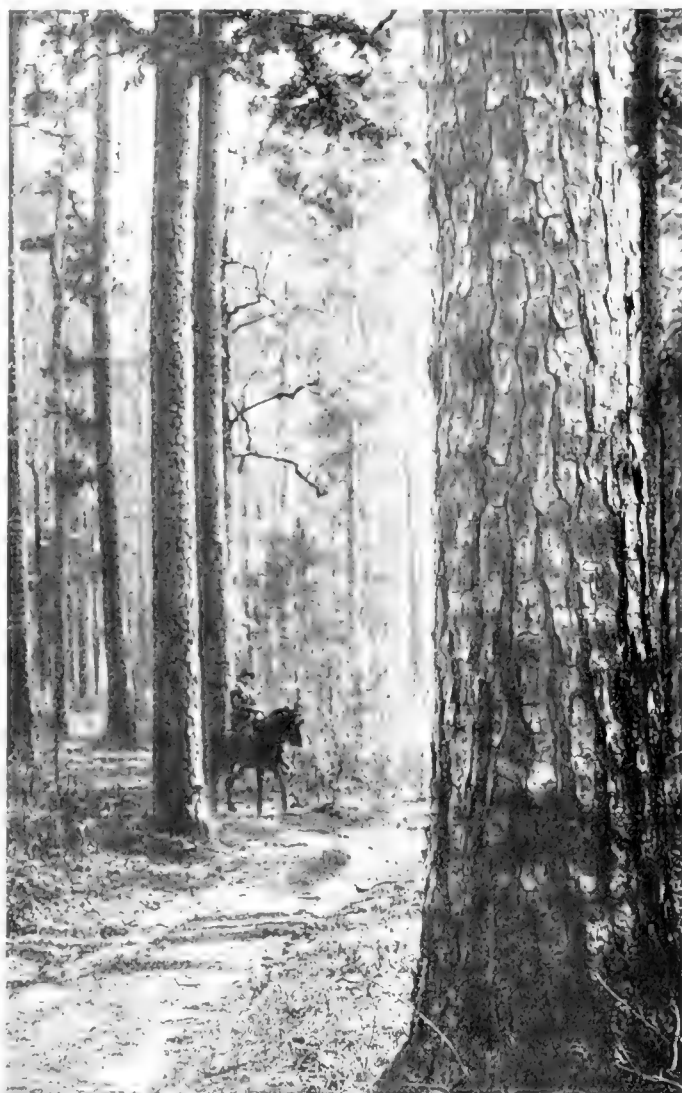
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Skogen, June, 1917.—Om det inflytande, som vara skogsvard-satgärder kunna utöva på skogsmarkens alstringsförmåga (Concerning the influence which our forest protective measures can exert on the productivity of the forest soil), by Henrik Hesselman, p. 165-85; Om planter och plantering (On plants and planting), by Ferd Lindberg, p. 186-92; Skogshögskolan och statens skogsförsöksanstalt (The forest school and the state forest experiment station), by Henrik Hesselman, p. 193-200.

Skogsvårdsföreningens tidskrift, April-June, 1917.—Studier över salpeterbildningen i naturliga jordmaner och dess betydelse i växtekologiskt avseende (Studies of nitrification in natural soils and its significance in plant ecology), by Henrik Hesselman, p. 321-446; Lärken och dess betydelse för svensk skogshushållning (The larches and their importance in Swedish forest management), by Gunnar Schotte, p. 447-706; Dimensionslagen och trävaruindustriens skogar (The dimension law and the timber industry of the forests), by K. G. Lundholm, p. 715-17; Finsk skogsstatistik (Finnish forest statistics), by T. J. B., p. 717-19.

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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by co-operation; without adequate fire protection all other measures for forest crop production will fail.

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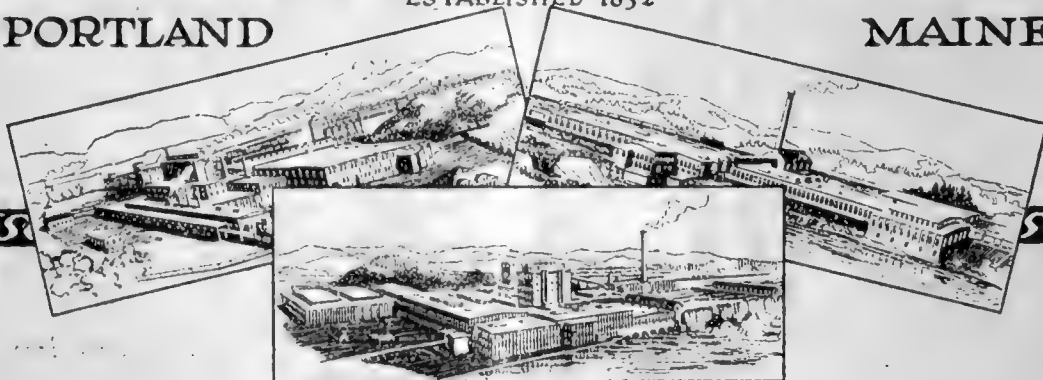
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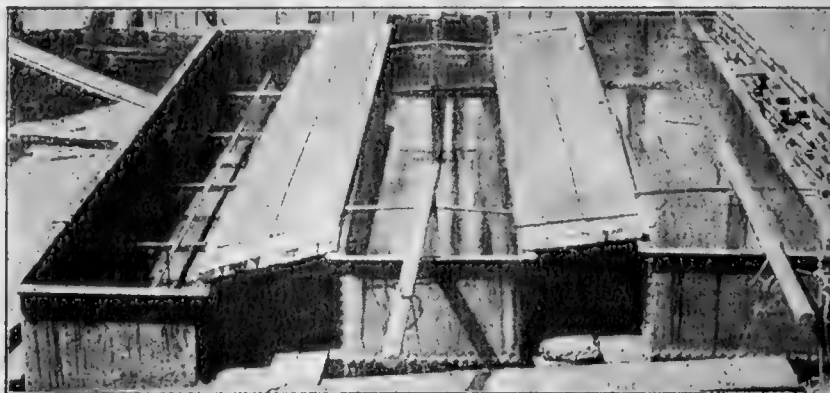
NOVEMBER 1917

NUMBER 287

American Forestry



An Illustrated Magazine about Forestry and
Kindred Subjects Published Each Month
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Washington, D.C.



Open-Tank Process creosoting-plant erected by the Bryant Paper Company, Kalamazoo, Mich., under the direction of Mr. F. W. Sutherland, in operation for several years. All structural wood exposed to decay is creosoted by this mill.

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There has been much discussion, pro and con, on the advisability of using creosoted planking for roofs over weave-sheds of textile-mills and machine-rooms of paper-mills. To clarify the situation the following authorities are quoted, viz.:

Dr. Herman Von Schrenk,
St. Louis:

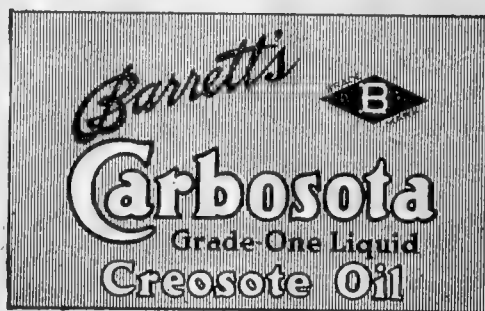
"The very severe humidity conditions, particularly in the weave-sheds, indicate that the use of untreated yellow pine will in many cases probably be impracticable, no matter how high the grade; in other words, untreated pine will doubtless fail by decay, due to the extraordinary conditions, in spite of the greatest care. This naturally leads to a discussion as to the possibility of artificially preserving the timbers, particularly the roof-planking. One naturally thinks first of all of creosote. An effective way of using creosoted planking would consist in covering the creosoted timber with sheathing, as there would be no possibility of creosoted planking decaying and the sheathing could be painted as often as necessary.

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F. J. HOXIE,

Engineer, Inspection Department, Associated Mutual Factory Fire Insurance Companies, Boston:

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A "close-up" section of roof weakened to a danger-point due to decay of planking. (Courtesy American Lumberman.)

outer planking BEING THOROUGHLY CREOSOTED and separated from the inner by mopped, tarred paper." (American Lumberman, June 23, 1917, page 41).

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Engineers and Architects,
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(Engineering News-Record, July 5, 1917, page 29).

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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

NOVEMBER 1917 VOL. 23

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AMERICAN FORESTRY

VOL. XXIII

NOVEMBER 1917

NO. 287

RELIEF FUND FOR THE FORESTRY REGIMENTS

TO meet the needs of individual members of the American Forest Regiments in France and their dependent families, it is essential that prompt response be made to the financial requirements of the Lumber and Forest Regiments' Relief Fund. The American Forestry Association, in making earnest appeal to its members and its friends for contributions for this splendid cause, does so with an assurance and confidence based on the intimate relationship which exists between forest lovers and the men who are risking their lives in the French war zone for the sake of the American flag.

In a peculiar sense this Association has deep interest and responsibility in the success of the fund. The plan for relief for the men of the Forest Regiments found its inception within the Association. Conceived as the American Forestry Relief and Comfort Fund, the project found rapid expansion until it was deemed desirable to broaden its scope and influence as indicated by the name with which it has been rechristened, the Lumber and Forest Regiments' Relief Fund. In this form and under its present scheme of organization it co-ordinates the forces of various interests affiliated with forestry, lumbering and kindred industries. These allied influences are equally impressed with the vital importance of the undertaking and equally concerned with its successful achievement.

The need for a fund of this nature speaks for itself. With the 10th Engineers (Forest) already in France, and with the 20th Engineers (Forest) preparing to enter the service, the United States will have more than 9,000 foresters and woodsmen in the French forests. These men go oversea for a purpose in no degree less vital to military success than that which takes our trench fighters and other armed forces into the foreign zone of battle. Without the Forest regiments the fighters would be of little avail. These men have not gone to France to serve personal ambition or to pursue any fanciful occupation of doubtful worth. They are there because of the urgent needs of the Allied armies for trench timbers and other building material requisite to modern warfare. These needs are universally recognized by the army leaders of the Allied nations. It is at the insistent demand of these leaders that the regiments have been ordered to the war zone.

In their voluntary enlistment in the Forest Regiment thousands of red-blooded Americans have answered the call of duty at great personal cost. The regiments are made up of foresters, practical lumbermen and sawmill operators, men of engineering or military training,

picked woodsmen, sawmill workers, skilled axmen, wood-sawyers, crosscut-saw filers, tie-hewers, skidders, teamsters, blacksmiths, millwrights, mill sawyers, circular-saw filers, millhands, carpenters, machinists, charcoal burners, motor truck and motorcycle operators and repair men. These men are all trained workers. As such they are capable of commanding high wages in their daily work. In the service of their country privates in foreign service draw monthly pay ranging from \$33 to \$36.60 each. It involves no task in figures to realize the sacrifice these men make in accepting the pay of private soldiers at a time when home wages are higher than at any time in the history of the world; and it requires no flight of the fancy to realize that the pay given them for their work in the French forests will be sadly deficient for the needs of such families as may be left behind.

It is in recognition of this condition that the relief fund is created. That many of the men should leave their families illy prepared to provide for themselves is inevitable. This circumstance makes it imperative that generous help should be swiftly given, to the end that no suffering or hardship which could be prevented is permitted to exist. The logical source of such helpfulness is with the people of America who are interested in these men through the kinship arising from mutual interest in the woodland and lumber resources of the country. Those whose interest in the forests is sentimental have common cause with those who are concerned with the economic wealth of the timberlands. Whether one's love for the trees is based on the lure of the great outdoors or whether it is purely commercial, the sacrifices of the men of the woods and lumber camp must necessarily make direct appeal. The cause is as broad as humanity; the results will be both human and practical.

As a part of the work a committee of women has been organized by Mrs. Henry S. Graves, wife of United States Forester Graves, who is now Lieutenant Colonel in charge of forest work with the United States Expeditionary Forces. This committee will assume the duty of providing sweaters and other knitted garments for the men of the Forest Regiments. Shortly letters will be sent to women of America known to be interested in forestry, requesting co-operation in the knitting of these garments. Wool will be furnished at cost to those workers who prefer to pay for it and, as far as possible, without charge to those who prefer to give their time only.

Contributions for the Lumber and Forest Regiments' Relief Fund should be sent to the American Forestry Association, Maryland Building, Washington, D. C.

FORESTERS IN WORLD'S LARGEST REGIMENT

AS the largest regiment in the world the 20th Engineers (Forest) will command the respect of Allies and enemy alike. This regiment is now in advanced stages of organization. Its ten battalions of foresters, woodsmen and lumbermen will have a strength of 7,500 enlisted men. In addition there will be nine service battalions with a strength of 7,250 enlisted men. The men in the service battalions will be laborers, for use in connection with the operations of the regiment. The total strength of the regiment will approximate 17,000 officers and men, which will establish a new record for military formation. It was announced early in November that two battalions of 750 men each were completely organized and would proceed to France at once. Two more battalions were to be organized immediately and the others will follow in close succession until the entire strength is in the French forests.

Col. W. A. Mitchell is commander of the regiment. He is a native of Georgia and a regular army man, who graduated from West Point with first honors. Colonel Mitchell has been in command at the encampment at the American University, District of Columbia, where the organization of the regiment has been taking place. Officers at regimental headquarters are:

Regimental surgeon, Major W. C. Moore, National Army, Virginia, graduate of the University of Virginia; regimental adjutant, Capt. H. L. Bowlby, National Army, Oregon, West Point graduate and State Highway Engineer for Oregon; regimental Engineer officer, Captain F. M. Bartelme, National Army, Minnesota, president of the Bartelme (Lumber) Company, Minneapolis; regimental supply officer, Captain P. E. Hinkley, National Army, Maine, assistant general manager of S. D. Warren & Company, Boston, Massachusetts.

For the First Battalion the officers are as follows:

Major E. E. Hartwick, president Hartwick Lumber Company, Detroit, Michigan, first vice-president Guaranty Trust Company, Detroit.

Captains: Leon M. Pill, division engineer Mobile & Ohio R. R., Mobile, Alabama; Harry V. Campbell, engineer officer, sawmill owner and operator; Arthur W. Elam, president A. W. Elam Company, logging engineers, San Francisco, California; Andrew J. Fisk, consulting civil and mining engineer and general contractor, Montana; H. W. Bostzkes, district engineer, Washington State Highway Department.

First Lieutenants: L. J. Freedman, supply officer, pulpwood

buyer and contractor for International Paper Company; Germain P. Graham, consulting municipal engineer, Albany, New York; J. C. Williams, Jr., assistant general manager, Geneva Lumber Company, Eleanor, Florida; Duncan P. Shaw, sawmill owner and operator, North Carolina; Harold C. Lyons, consulting efficiency engineer, New York City; William A. Clark, manager Walter D. Noyes Lumber Company, Boston, Massachusetts; T. W. Poindexter, municipal engineer, New York State; R. N. Benjamin, director of vocational training, Fitzgerald High School, Fitzgerald, Georgia; W. J. Wilson, district engineer, port of Seattle, Seattle, Washington; J. L. Wood, sawmill operator.

Second Lieutenants: John B. Cuno, forester, West Virginia; R. L. Chaffin, consulting engineer, West Palm Beach, Florida; Arthur N. Drips, efficiency engineer for lumber industry, Western Washington; L. B. McDaniel, district manager for lumber interests, Georgia; Hollister Johnson, junior engineer, New York State Conservation Commission; H. T. Hopkins, wholesale and retail dealer in finished pine lumber, Hortsville, South Carolina.

For the Second Battalion the officers are as follows:

Major S. O. Johnson, vice-president Weed Lumber Company, Weed, California.

Captains: F. F. Spencer, assistant to the president of the McCloud River Lumber Company, McCloud, North Carolina; F. A. Horstkotte, master mill builder and inventor of sawmill machinery, formerly connected with W. A. Wilkinson; W. V. Brookings, vice-president of the California-Oregon Lumber Company; J. C. Perry, connected with the Diamond Match Company, the McCloud River Lumber Company and the Weed Lumber Company; J. C. Long, civil engineer, connected with the Milwaukee Lumber Company.

First Lieutenants: M. R. Ethell, civil engineer, with general engineering experience; E. D. Woodruff, civil engineer, with experience in timber work and general engineering work, a brother of Col. James A. Woodruff, of the 10th Engineers (Forest); W. O. Crosby, superintendent of the mills of the Holmes Lumber Company, of Oregon; Marion Nine, owner and operator of sawmills and president of the Nine Lumber Company; Frank R. Prince, assistant manager of the Shevlin Hickson Company; P. D. Mackie, civil engineer, with five years' experience in shingle mills in Washington; W. H. Crosson, civil engineer,

with special experience in bridge building; R. W. Pilling, general superintendent of the Rogers Lumber Company; L. R. McCoy, assistant manager of the Edward Rutledge Timber Company; W. E. Volk, civil engineer, with railroad experience on the Pacific Coast and in Alaska and Panama.

Second Lieutenants: M. L. Johnson, assistant engineer with the Weed Lumber Company, Weed, California; E. S. Brush, thoroughly versed in lumber operations, connected with the Loop Lumber Company; W. H. Grover, assistant engineer with the Fruit Growers' Supply Company, on the Pacific Coast.

Since the first American Foresters went to France several important changes have taken place in the personnel. The Forest Service has received word that United States Forester Henry S. Graves has been promoted to lieutenant colonel. Forester Graves was one of



COL. W. A. MITCHELL, U. S. A., COMMANDING 20TH ENGINEERS (FOREST).



CAPT. H. L. BOWLBY, REGIMENTAL ADJUTANT, 20TH ENGINEERS (FOREST).



CAPT. F. M. BARTELME, REGIMENTAL ENGINEER OFFICER, 20TH ENGINEERS (FOREST)



CAPT. P. E. HINKLEY, REGIMENTAL SUPPLY OFFICER, 20TH ENGINEERS (FOREST).

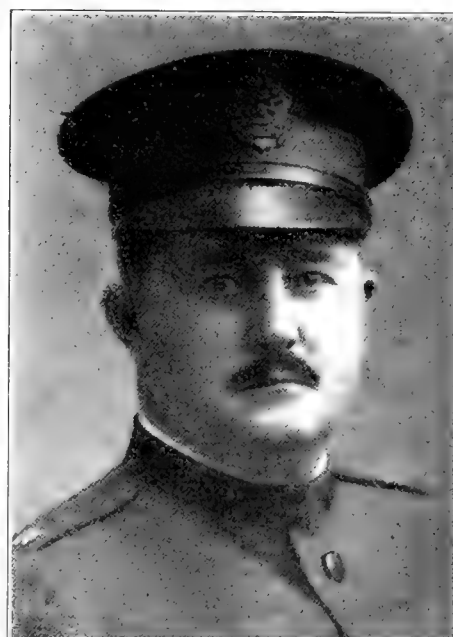
the first Americans to go into the war zone after the opening of hostilities with Germany. As director of the division of forestry with the American Expeditionary forces his duty has been to work out problems in connection with the general forestry situation in France, with reference to military needs and future development. He

is assigned to no regiment and appears on the records of the service as on temporary detail to the War Department. His original commission was as a major.

Word also comes from France that Major William B. Greeley has been assigned as deputy director, headquarters, division of forestry, American Expeditionary Forces. He is in charge of lumber operations and has supervision of the entire work in France. Major Greeley went to France early in August. Major Coert DuBois, who was district forester in charge of the National Forests of California, is on the regimental staff of the 10th Engineers (Forest). Donald Bruce (Yale, 1910), professor of forestry at the University of California, has been assigned in charge of timber reconnoissance in



MAJOR E. E. HARTWICK, 20TH ENGINEERS (FOREST).



MAJOR S. O. JOHNSON, 20TH ENGINEERS (FOREST)

France, over a party of six men. Swift Berry, who went as a civilian from the district office of the Forest Service at San Francisco, has been assigned as logging engineer. Theodore S. Woolsey, Jr. (Yale, 1902), who was formerly with the Forest Service and who went to France as a civilian, from Albuquerque, New Mexico, has

been assigned to special work and designated as timber negotiator.

The need for skilled workers in the French forests is considered urgent and vital by the army authorities of the United States and the allied nations. Their work will be to provide the timbers and lumber which are essential to military success and which cannot be provided through other channels. To ship the material from America is out of the question because of a lack of transportation facilities.

If the commander of any one of the 30 or more army camps in the United States wants to build a new warehouse or determines that a new bridge is a military necessity he has no difficulty in setting in motion the forces



FIRST AND SECOND BATTALIONS OF

This interesting picture of the initial units of the second regiment to be prepared for service in the French forests was taken at the regimental encampment at American University campus, Washington, D. C. The first regiment to go into the French forests as representative of the United States was the 10th Engineers (Forest), which has been in service since early in the autumn. The 20th Engineers (Forest) has already provided two battalions of 750 men each. The new regiment will be the largest regimental

organization in the world. When completed it will have ten battalions of foresters, lumbermen and sawmill workers and nine battalions of laborers for use in connection with the forest operations. This will give it a strength of upward of 17,000 men. The regiment will be un-





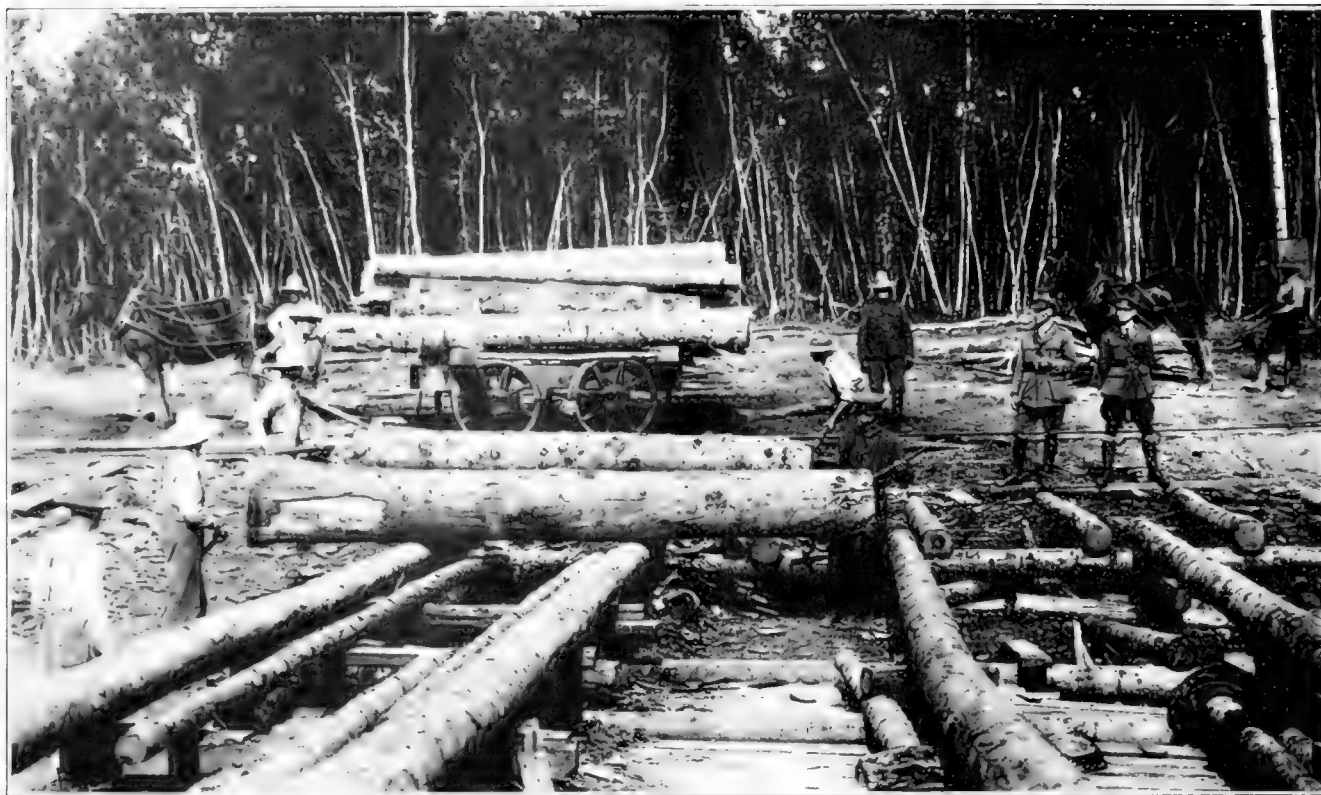
THE TWENTIETH ENGINEERS (FOREST)

der the command of Col. W. A. Mitchell, U. S. A. The work of the two regiments, insofar as concerns forestry, lumbering and sawmill operation, will be under the general supervision of Lieut.-Col. Henry S. Graves, who is on leave of absence from his duties as United States Forester. He is director of the division of forestry with the American Expeditionary Forces. Major William B. Greeley, assistant United States Forester and a director of the American Forestry Associa-

tion, is deputy director of the division of forestry.

Recruiting of the third battalion of the 20th was well under way early in November and this organization will soon be ready for service. The first and second battalions were reviewed by Secretary of War Baker and Chief of Engineers Black on November 10 and received warm praise for their appearance and condition. Some idea of the work the regiment will do in France is given by pictures in this issue.





LUMBERING OPERATIONS WITH THE BRITISH ARMY

In this picture is shown some of the work of the Canadian Forest section on the western front. The men are engaged in bringing in the timber from the forests, ready for sawmill operations. The character of the logs shows the care exercised by the foresters in making selections, while the trees in the background show possibilities for the future of French forestry.

necessary to its construction. The machinery for his purpose is all ready for its work. Through the agencies concerned with army supplies his material is provided by a businesslike organization geared to high measure of efficiency. The Council of National Defense, through its lumber director, designates the lumber that may be delivered with least loss of time and minimum strain on congested transportation facilities. This lumber is promptly acquired through the War Department's purchasing agencies and quickly delivered by railroads trained to giving war-time priority to military shipments.

Suppose, however, that this same commander were in the French war zone where there are no sawmills and no railroads, no Council of Defense and no transportation. His one resource is the native forest. For his lumber he must depend on the trees nearest at hand. To make these trees available is not a problem for the man at a mahogany desk in Washington. It is a job for trained foresters and trained lumbermen on the spot, for experts skilled in the selection of timbers and their swift and workmanlike conversion into building material. It is a task for the ax and the sawmill rather than for the council table and the issuing of typewritten orders. The machinery which makes for efficiency in the United States could not be utilized even if it were available. The one thing that will solve the problem is the immediate activity of such military units as the Forest Regiments, contributed to the allied cause by the American Government.

It is to handle such needs of war that the 10th Engi-

neers (Forest) has already been sent to France and the 20th Engineers (Forest) is being prepared to go across. These organizations will provide lumber for the almost endless needs of the allied armies. Modern warfare demands the construction of wharves, warehouses, storehouses, hospitals, depots, shops and other buildings necessary to shelter the army and its ammunition and supplies. The corps of engineers must build and operate railroads connecting the wharves and shops with the storehouses and depots and the latter with points as close as possible to the scene of fighting. Roads must be constructed and repaired, bridges built, repaired and strengthened and fortifications and other defensive works constructed. For these purposes the trees of the French forests must be felled and converted into railroad ties and other timbers and much of this work must be done by the engineer regiments of American foresters, woodsmen and sawmill men.

The work that takes these men to France is essentially the work of wartime emergency. Military leaders agree that the man who provides lumber for use in the war zone is performing a duty as essential as that of the man on the firing line. This completely disposes of the criticism in some quarters that the expense of sending these regiments to France and maintaining them there makes the cost of their lumber output from \$300 to \$400 a thousand feet. The absurdity of such criticism is as obvious as its lack of patriotism. Similar reasoning might be applied to the work of the Red Cross and the ambulance service. It might be pointed out that it is much cheaper to let men

be injured here at home than to send them into foreign battlefields, on the theory that a man who becomes ill or injured in an American city may procure hospital treatment at much less cost than is involved in the same treatment in a zone of war. So far, however, no earnest critic has come forward with any such suggestion. Nor has it been urged that the relief agencies be abolished because of the expense involved. Perhaps all of the possibilities in the line of such criticism are not yet exhausted. The further progress of the war may be illumined by many thoughtful suggestions of this nature. In common with the pacifists such profound economists have ideas that are prolific as well as picturesque and we may yet hear them urging that it is cheaper for the soldiers to stay at home than for the government to go to the expense of sending them across the seas. The subject is limitless.

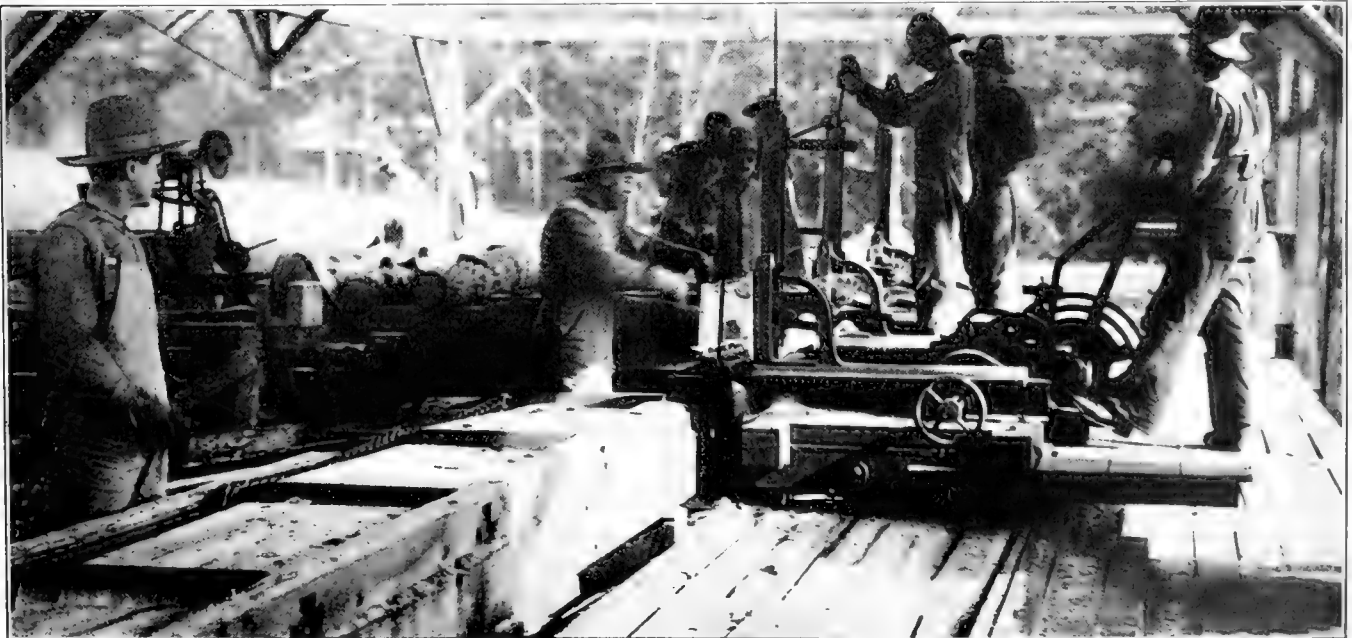
One of the important duties of the trained foresters is the selection of those trees which may be best harvested without ruining the forests. The woodsmen and sawmill workers include men skilled in the handling of lumber from the time the tree is marked for cutting until the log passes through the mill and the material is ready for use in the building of trenches or otherwise.

A constant problem of the American lumber worker in the French forests is the handling of trees in which fragments of shell are embedded. The German spirit of destruction in the enemy's country has left large sections of woodland in which serious damage has been done. Chunks of shell have found lodgment in the bodies of trees and in the course of months these pieces of metal have in many cases become overgrown and difficult of detection through superficial inspection. Consequently there is trouble when the log comes under the saw and this makes the work of producing lumber especially difficult and an undertaking requiring much care.

Another phase of destructiveness practiced by the invaders has been the damage done to orchard trees. Vast areas of the trees were cut down completely and in other vast areas, where pursuit left no time for this process, German "Kultur" expressed itself in cutting off a circle of bark around each tree. By this latter process it was sought to kill apple, peach, plum, apricot and cherry trees which had been growing for years. Trained workers succeeded in saving trees of both classes. Those which had been cut down were grafted to their own stumps by careful treatment and during the recent summer they again blossomed and bore fruit. Those which had been ringed were treated with grafting cement and the wounds carefully bandaged. In this work not only French soldiers were engaged under officers familiar with forestry and tree surgery, but army surgeons and Red Cross workers gave assistance. Frequently use was made of bandages that had been prepared for human wounds. When supplies ran short tar and clay were used instead of cement and twisted moss was tied around the dressed wounds instead of bandages. By these methods years have been saved in restoring the otherwise ruined orchards.

Late in October French aviators found that in the Laon sector the German troops were again resorting to the destruction of villages and trees, indicating another "strategic retreat," similar to that which took place earlier on the Arras Camines front.

Vivid pictures of the ruin that has been wrought is given by German papers. The Berlin Lokal Anzeiger describes a strip of country from six to eight miles in width and extending along the whole of the new German position as having been turned by the Imperial army into dead territory, "presenting a terrible barrier of desolation to any enemy hardy enough to advance against our



WHERE THE SOUND OF THE SAWMILL BLENDS WITH THE ROAR OF ARTILLERY

This is a picture of a sawmill somewhere near the French battle front. Some of the sawmill units are located so near to the fighting lines that they hear the booming of cannon and the bursting of shells as a part of their daily routine. Shells embedded in tree trunks are a frequent source of trouble in the operation of the sawmills, but in spite of the handicaps the output of each unit is constant and indispensable to military operations. The mill here pictured is typical of the environment of the sawmill men who go with the Forest Regiments.



DELIVERY SYSTEM FOR FINISHED LUMBER IN FRANCE

After the foresters, woodsmen and sawmill workers have finished their share of converting the French forests into construction material the lumber is loaded on powerful trucks for distribution to such building operations as may be going on. This section of the war zone lumber yard is devoted to finished sleepers. No time is lost between tree felling and delivery of lumber, as all the work is done under military discipline.

new lines. No village or farm was left standing on this glaxis, no road was left passable, no railway track or embankment was left in being. Where once were woods there are gaunt rows of stumps; the wells have been

blown up; wires, cables and pipe lines destroyed. In front of our new positions runs, like a gigantic ribbon, an empire of death." This is typical of the situation that has been created by the enemy and which must be over-



WAR ZONE FORESTERS BUILDING RAILROAD

The Canadian Forest Section by no means confines itself to lumbering and sawmill work. Railroads are essential to modern warfare and these men are constructing a line through a French forest. The Forest Section is doing the entire job, from cutting ties to grading and tracklaying.



CANADIAN WOODSMEN IN THE WAR ZONE

These men are types of the forest workers sent overseas as a part of Canada's contribution to the cause of the Allies. The sergeant on the right has three sons serving in France, one of them a captain and the others lieutenants.

come by American forest regiments and engineers. Canada has already sent more than 10,000 men overseas in forest battalions and additional large numbers who had already crossed with the army have been organized into forest companies.

Recruiting of the 20th Engineers (Forest) has been going on throughout the country. Listing offices were established in each state to receive applications for enlistment from men willing to take service in the regiment. These listing offices were in addition to the regular army recruiting offices, through all of which applications are received. As rapidly as accepted and enlisted for service in the regiment the men were gathered at the American University in the District of Columbia, on the campus of which institution the regimental camp is located. In this camp they are immediately placed under military discipline and training, with a routine of daily work calculated to put them into trim for organized work as soon as they reach their destination in Europe. In addition to the men received through the various listing offices and recruiting stations the roster included a large number of men from the drafted army. At the various encampments of the National Army men who are found to have had woods and lumber experience are detailed to the forest regiment and this will doubtless continue to be an important factor in quickly filling the ranks of the organization.

For the new regiment three hundred and nine commissioned officers are required. These officers are men of technical training in various lines. Two-thirds of them



HOUSING THE FOREST REGIMENT

The type of barracks in which the men live at American University while undergoing the necessary training before being shipped to France to work in the forests of that country.

are practical lumbermen or sawmill operators and one-third technical foresters with long woods experience. In the selection of these officers the Forest Service had the co-operation of fourteen committees of lumbermen representing districts throughout the country. These nominating committees included some of the best-known lumbermen in the United States. Almost every man selected was interviewed by a lumberman's committee or by the Forest Service officials. Many private foresters and forest schools assisted in finding technical men suitable for appointment and it is declared that all the men selected have proved by experience their qualities of leadership and their ability to handle men in large numbers.

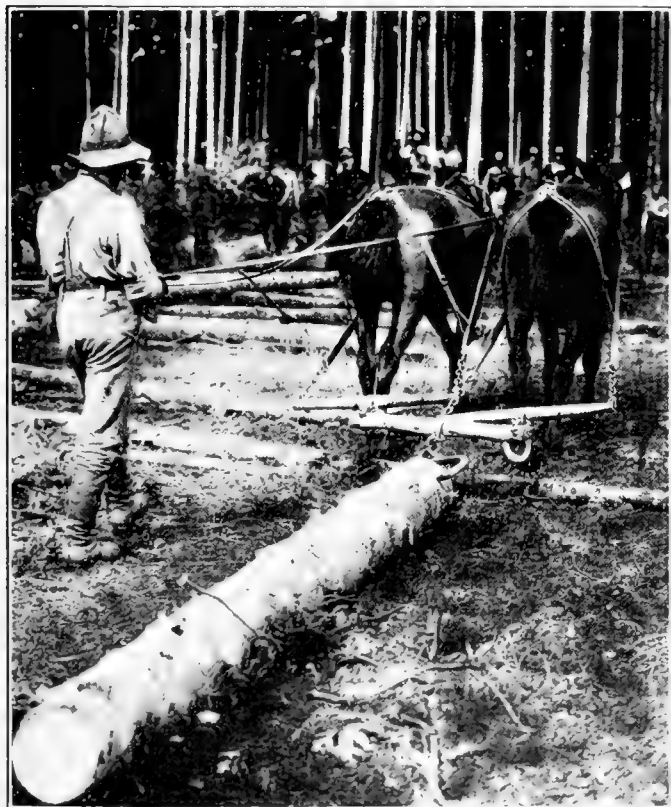
The age limits set at the beginning of the undertaking required that all officers of the forest battalions should be not less than 31 years of age. Because of the difficulty of finding enough men suitable for lieutenants the age limit was later lowered to 25. The bulk of the men recommended for lieutenancies range in age from 25 to 35, as captains from 30 to 40 and as majors from 40 to 50. The men who have been recommended have been notified that all further steps, as to physical examination, the issuance of commissions and the order in which successful applicants will be called for service, rest with the War Department. Not all of the men accepted will be called into service at once. In order to provide for future contingencies it was decided to commission at the present time enough officers to care for the other battalions yet to be raised.

Late additions to the roster of officers of the 20th Engineers (Forest) were announced as follows:

Regimental Headquarters—Major E. H. Marks, acting lieutenant colonel; Lieut. J. W. Herbett, veterinary detachment; First Lieut. C. W. Smith, chaplain.

First Battalion Headquarters—First Lieut. R. B. Hill, medical officer; First Lieut. R. F. Roudybush, dental officer.

First Battalion (Company B)—Capt. C. B. Cutting, commanding; Second Lieut. C. B. Bradley.



NOT MUCH SUGGESTION OF WAR HERE

Skidding logs is the same thing, whether in a peaceful western logging camp or in the war zone. These men are operating on the western front in France and the timbers are used in trench building and other forms of defense construction.

Second Battalion Headquarters—First Lieut. J. B. Swafford, medical officer; First Lieut. C. P. Hatrick, dental officer.

Second Battalion (Company B)—First Lieut. Charles C. Kelley.

Third Battalion Headquarters—Major B. F. Wade; Capt. E. H. Sargent, adjutant; Capt. O. H. Todd, acting adjutant; Capt. W. H. Estabrook, supply officer, and First Lieut. A. H. Ellison, engineer officer.

Company A—Captain, C. E. Clark; first lieutenants, W. G. Conklin, P. D. Mackie, C. M. Jenkins; second lieutenants, E. B. Birmingham and Harold M. Power.

Company B—Captain, E. P. Dudley; first lieutenants, G. C. Eastman, L. W. Jacobs, M. Vanmeter; second lieutenant, L. B. McDaniels.

Company C—Captain, S. C. Phipps; first lieutenants, C. C. Abbott, H. H. Miller, F. B. Judge; second lieutenants, O. J. Davis, A. L. Hyde and John Summerset.

The district committees of lumbermen for nominating officers were made up as follows:

District No. 1 (Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island)—H. B. Stebbins, chairman, H. B. Stebbins Lumber Company, Boston, Mass.; M. A. Brown, Parker & Young Co., Boston, Mass.; F. B. Cutler, Stetler-Cutler Company, Boston, Mass.; H. G. Philbrook, Connecticut Valley Lumber Company, Boston, Mass.; H. W. Blanchard, H. W. Blanchard Lumber Company, Boston, Mass.; C. W. Whitney, Perry-Whitney Lumber Company, Boston, Mass.

District No. 2 (New York)—Ferris J. Meigs, chairman, Santa Clara Lumber Company, Tupper Lake; W. L. Sykes, Emporium Lumber Company, Buffalo; Frank L. Moore, Watertown; Maurice Hoopes, Finch, Pruyn & Co., Glens Falls; J. M. Gamble, Brownville Board Company, Brownville; W. C. Hull, Oval Wood Dish Company, Tupper Lake.

District No. 3 (Pennsylvania and New Jersey)—N. P. Wheeler, Jr., chairman, Wheeler & Dusenbury Lumber Company, Endeavor, Pa.; A. W. Mallinson, Central Pennsylvania Lumber Company, Williamsport, Pa.; R. R. Chaffee, Wheeler & Dusenbury Lumber Company, Endeavor, Pa.

District No. 4 (Delaware, Maryland, Virginia, West Virginia, North Carolina and South Carolina)—C. L. Millard, chairman, John L. Roper Lumber Company, Norfolk, Va.; W. M. Ritter, W. M. Ritter Lumber Company, Columbus, Ohio; J. S. Holmes, State Forester, Chapel Hill, N. C.; George L. Forrester, secretary Western North Carolina Logging and Lumber Company, Asheville, N. C.; E. W. Durant, Jr., E. P. Burton Lumber Company, Charleston, S. C.

District No. 5 (Georgia, Florida and Alabama)—M. L. Fleischel, chairman, Carpenter-O'Brien Lumber Company, Jackson-

ville, Fla.; R. H. Paul, Watertown, Fla.; M. M. Bond, Bond Lumber Company, Lake Helen, Fla.

District No. 6 (Ohio, Indiana, Illinois, Kentucky and Tennessee)—W. E. DeLaney, chairman, Kentucky Lumber Company, Lexington, Ky.; J. M. Pritchard, secretary, Gum Manufacturers' Association, Memphis, Tenn.; R. R. May, Southern Hardwood Traffic Association, Louisville, Ky.

District No. 7 (Michigan and Wisconsin)—John W. Blodgett, chairman, Grand Rapids, Mich.; R. S. Kellogg, National Lumber Manufacturers' Association, Chicago, Ill.; H. C. Hornby, Cloquet, Minn.; Benjamin Finch, Finch Bros., Duluth, Minn.

District No. 8 (Minnesota)—H. C. Hornby, Cloquet, Minn.; F. W. Wilhelm, Cloquet Tie & Post Co., Cloquet, Minn.; Benjamin Finch, Finch Bros., Duluth, Minn.

District No. 9 (Mississippi and Louisiana)—C. S. Williams, chairman, Patterson, La.; S. T. Woodring, Lake Charles, La.; E. A. Frost, Shreveport, La.; R. B. Carrier, Sardis, Miss.; F. W. Pettibone, Kiln, Miss.

District No. 10 (Missouri, Arkansas, Oklahoma and Texas)—Chas. S. Keith, chairman, Kansas City, Mo.; R. A. Long, Kansas City, Mo.; J. B. White, Kansas City, Mo.; W. R. Pickering, Kansas City, Mo.; L. L. Seidel, Kansas City, Mo.

District No. 11 (Montana, Idaho and Wyoming)—A. W. Laird, chairman, Potlatch, Id.; P. M. Lachmund, Potlatch, Id.; R. M. Hart, Couer d'Alene, Id.; J. A. McCann, Libby, Mont.; Kenneth Ross, Missoula, Mont.; E. H. Van Ostrander, Winchester, Id.

District No. 12 (Washington and Oregon)—George S. Long, chairman, Weyerhaeuser Timber Company, Tacoma, Wash.; J. J. Donovan, Bloedel-Donovan Lumber Mills, Bellingham, Wash.; E. G. Ames, Puget Mill Company, Seattle Wash.; George M. Cornwall, "The Timberman," Portland, Ore.; A. L. Paine, West Coast Lumberman's Association, Hoquiam, Wash.; Henry Kirk, Beaver Lumber Company, Portland, Ore.

District No. 13 (California and Nevada)—S. O. Johnson, Weed Lumber Company, San Francisco; E. H. Cox, Weed Lumber Company, San Francisco; O. C. Haslett, California Pine Box and Lumber Company, San Francisco; W. P. Johnson, Weed Lumber Company, San Francisco; C. Stowell Smith, secretary California Sugar and White Pine Manufacturers' Association, San Francisco.

District No. 14 (Colorado, Utah, Arizona and New Mexico)—William P. McPhee, chairman, McPhee and McGinnity Lumber Company, Denver, Col.; Smith Riley, District Forester, Denver, Col.; T. A. Shonberg, Continental Tie and Timber Company, Denver, Col.; B. Coldren, Hallack and Howard Lumber Company, Denver, Col., assisted by M. J. Riordan, Saginaw and Manistee Lumber Company, Flagstaff, Ariz.

AMERICAN FORESTERS IN MILITARY SERVICE

This list is compiled from various sources. Every effort has been made to make it complete and accurate, but in the nature of things there are necessarily omissions and errors. The list will be reprinted and increased from month to month. All foresters and others who can supply additional names or note corrections are urged to communicate with American Forestry as promptly as possible, to the end that the list may have full value as a record of the men who have gone to war.

AGEE, Fred B., Deputy Forest Supervisor, U. S. F. S.
Albano, Jack, forest ranger, U. S. F. S.
Aldous, Tura M., grazing, U. S. F. S.
Alexander, J. B., 1st Lt. Aviation Corps, (Uni. of Wash., '17).
Ames, F. E. (Yale For. School '05).
Anderson, A. C., 2nd Lt. U. S. A. (Uni. of Wash., '17).
Anderson, Emil A., deputy forest supervisor, U. S. F. S.
Archer, Frank L., forest clerk, U. S. F. S.
Atkinson, E. S., (Yale For. School, '16).
Avery, B. F., commissioned in Eng. (Forest) forces; (Yale For. School); Spanish River Pulp and Paper Mills.

BADERTSCHER, Ed., temporary clerk, U. S. F. S.
Baker, Hugh P. (Yale For. School, '04), N. Y. State Col. of Forestry.
Baldenburg, Max B., clerk, U. S. F. S.
Barr, John B., forest ranger, U. S. F. S.
Barlow, Harold (Yale For. School, '14).
Bastian, Clyde E., Corp. 20th Eng. (Forest), (Uni. of Mich., '16).
Batten, R. W. (Yale For. School, '16).
Beaman, Clarence W., messenger, U. S. F. S.
Bedwell, Jesse L., forest ranger, U. S. F. S.
Bell, George R. (Yale For. School, '18).
Benedict, M. S., 1st Lt. 10th Eng. (Forest), for. sup., U. S. F. S.
Benedict, Raymond E., Major 10th Eng. (Forest), For. Br. B. C.
Bentley, George A., Capt. Quartermaster's Dept., purchasing agent U. S. F. S.
Bennett, Edwin L., forest ranger, U. S. F. S.

Bernhardt, Carl L., (Uni. of Wash., '18).
Berry, John K., scaler, U. S. F. S.
Berry, Swift, forester, U. S. F. S.
Betts, Fred H., forest ranger, U. S. F. S.
Bevan, Arthur (Uni. of Wash., '17).
Billingslea, James H., Jr., Top Sergeant (Uni. of Wash., '14), forest ranger, U. S. F. S.
Bird, R. J., Corp. 20th Eng. (Forest), (Cornell, '16).
Bird, Vern A., forest ranger, U. S. F. S.
Bloom, Adolph, Ensign U. S. N. Train. Sta. (Uni. of Wash., '16).
Bonney, Parker S., Sub. Lt. British Navy (Uni. of Wash., '13).
Bowen, Jos. B. (Yale For. School, '17).
Bradley, Tom O. (Mt. Alto), Pa. Dept. For.
Brady, Charles C. (Uni. of Wash., '18).
Breneman, Howard E. (Mt. Alto For. Acad., '17), Co. C., 10th Eng. (Forest), Pa. Dept. For.
Brewster, Donald R., forest examiner, U. S. F. S.
Brindley, Ralph, 2nd Lt. R. O. T. C. (Uni. of Wash., '17).
Brooks, James F., forest ranger, U. S. F. S.
Brown, Bascom H., forest ranger, U. S. F. S.
Brown, Vance, scaler, U. S. F. S.
Browning, Harold A., asst. forest ranger, U. S. F. S.
Broxon, Donald (Uni. of Wash., '14).
Bruce, Donald, Prof. of For., Uni. of Cal. (Yale For. School, '10; assigned in charge of timber reconnaissance in France).
Bryant, Edward S., Capt. 10th Eng. (Forest), for. ins., U. S. F. S.
Buch, John Edward (Mt. Alto For. Acad., '17), Co. C., 10th Eng. (Forest), Pa. Dept. For.

Buck, Shirley, National forest inspector, U. S. F. S.
 Burgess, John, surveyor draftsman, U. S. F. S.
 Burnham, R. P. (Uni. of Wash., '17).
 Buttrick, P. L., Amer. Ambulance Serv. (Yale For. School, '11).

CALKINS, Hugh G. (Yale For. School, '09), forest supervisor, U. S. F. S.

Calloway, G. A. (Uni. of Mo.).
 Calvert, Gerald F. (Uni. of Wash.).
 Cameron, J. F. (Uni. of Wash., '19).
 Cappel, Frederick, forest clerk, U. S. F. S.
 Cassidy, Hugh O., forest ranger, U. S. F. S.
 Cecil, Kirk P., surveyor, U. S. F. S.
 Chudderdon, Harold A., forest ranger, U. S. F. S.
 Chamberlain, Harry A., forest ranger, U. S. F. S.
 Chapman, Charles S., Major 10th Eng. (Forest), (Yale For. School, '02), forestry assistant, U. S. F. S.
 Charlson, Alex., (Uni. of Wash., '16).
 Christensen, Alfred C., forest clerk, U. S. F. S.
 Clark, Donald H., 1st Lt. R. O. T. C. (Uni. of Wash., '17).
 Clark, E. V., forest supervisor, U. S. F. S.
 Clemmons, Walter C., forest ranger, U. S. F. S.
 Condon, H. R., 2nd Lt. 10th Eng. (Forest), Pa. R. R. forester.
 Conklin, W. Gardiner, 1st Lt. 20th Eng. (Forest), (Pa. State For. Acad., '08), Pa. Dept. Forestry.
 Cook, A. M. (Yale For. School, '08).
 Cook, John W., clerk, U. S. F. S.
 Cook, Samuel, forest ranger, U. S. F. S.
 Cookston, Roy, Capt. 10th Eng. (Forest).
 Cope, H. Norton, forest ranger, U. S. F. S.
 Cownan, Talmadge D., forest ranger, U. S. F. S.
 Critchley, Horace F. (Mt. Alto, '13), Res. Off. Tr. Camp, Ft. Niagara, Pa. Dept. For.
 Crumb, Isaac J. (Uni. of Wash., '20).
 Cuff, Ivan A., forest ranger, U. S. F. S.
 Culley, Matthew J., forest ranger, U. S. F. S.
 Cuno, John B., 2nd Lt. 20th Eng. (Forest).
 Curwen, William H., surveyor-draftsman, U. S. F. S.

DALLENBACH, Emil, messenger, U. S. F. S.
 De Camp, J. C., grazing assistant, U. S. F. S.
 Deering, Robert L., 1st Lt. 10th Eng. (Forest), forest examiner, U. S. F. S.
 Deutsch, Henry C., forest ranger, U. S. F. S.
 Doggett, William H. (Yale For. School, '17).
 Dorrance, John Gordon, 2nd Lt. E. O. R. C.
 Dorward, D. L. (Yale For. School, '14).
 Douglass, C. W. H., Aviation Corps (N. Y. State Col. of Forestry, '15), American Forestry.
 DuBois, Coert, Major 10th Eng. (Forest), dis. forester, U. S. F. S.
 Dubuar, James F., forest assistant, U. S. F. S.
 Dunn, Beverly C., Adjutant 10th Eng. (Forest).
 Dunning, Duncan, forest assistant, U. S. F. S.
 Dunston, Clarence R., 1st Lt., U. S. Indian Service.
 Dunwoody, W. B. (Yale For. School, '16).

ELDREDGE, Inman F., Capt. 10th Eng. (Forest), forest supervisor, U. S. F. S.
 Elliott, Harry R., forest ranger, U. S. F. S.
 Emerick, Lloyd P., forest clerk, U. S. F. S.
 Emerson, J. Ward, forest ranger, U. S. F. S.
 Evans, Vincent (Uni. of Wash., '16).
 Ewing, Robert B., forest ranger, U. S. F. S.

FAIRCHILD, Rollin A., forest clerk, U. S. F. S.
 Fifer, Charles (Uni. of Wash., '20).
 Fish, Harold (Uni. of Wash., '18).
 Fisher, David (Uni. of Wash., '14).
 Foess, Jacob E., 20th Eng. (Forest), (Mich. Ag. Col., '17).
 Foley, A. C., Corp. 20th Eng. (Forest), (Uni. of Mich., '18).
 Foran, Harold (Uni. of Wash., '16).
 Fowler, Frederick H., district engineer, U. S. F. S.
 Frankland, James, forest ranger, U. S. F. S.
 Fritchle, C. R. (Uni. of Mo.).
 Fritz, Emanuel (Yale For. School, '14), forest asst., U. S. F. S.
 Fuller, Francis S., forest assistant, U. S. F. S.

GALER, George E., forest ranger, U. S. F. S.
 Gallaher, W. H., 2nd Lt. (Yale For. School, '10), U. S. F. S.
 Garrett, C. B. (Uni. of Wash., '16).
 Gaylord, Donald (Yale For. School, '15).
 Gebo, L. W., 20th Eng. (Forest), (Cornell, '16).
 Gibbons, William H., 2nd Lt., forest examiner, U. S. F. S.
 Gill, Thomas H. (Yale For. School, '15), forest ranger, U. S. F. S.
 Gilman, John, forest ranger, U. S. F. S.
 Gilson, R. M. (Yale For. School, '17).
 Girk, Royal J., forest clerk, U. S. F. S.
 Godwin, D. P., 1st Lt. 10th Eng. (Forest), forest exam., U. S. F. S.
 Goodman, Walter F., forest ranger, U. S. F. S.
 Graham, Paul (Uni. of Wash., '13).

Granger, C. M., assistant district forester, U. S. F. S.
 Graves, Henry S., Lt. Col., director, division of forestry headquarters, American Expeditionary forces; United States Forester.
 Greeley, William B., Major, deputy director, division of forestry headquarters, American Expeditionary forces; assistant United States Forester.
 Grefe, Raymond F., forest ranger, U. S. F. S.
 Guthrie, John D. (Yale For. School, '06), forest sup., U. S. F. S.
 Guthrie, Richard T., forest examiner, U. S. F. S.

HAASIS, F. W. (Yale For. School, '13).
 Hackett, William, forest ranger, U. S. F. S.
 Hall, R. C. (Yale For. School, '08), forest examiner, U. S. F. S.; assigned to timber reconnaissance in France.
 Hansen, Thorvald (Yale For. School, '17), forest asst., U. S. F. S.
 Hansson, Arnold (Yale For. School, '17).
 Harding, Charles C. (Yale For. School, '16).
 Harlacher, Josef (Mt. Alto, '17), 20th Eng. (Forest), Pa. Dept. For.
 Harley, Percy H., forest clerk, U. S. F. S.
 Harmelling, H. (Uni. of Wash., '12).
 Hendrickson, Guy C., forest clerk, U. S. F. S.
 Hendrix, Albert W., forest ranger, U. S. F. S.
 Hicock, Henry W. (Yale For. School, '15).
 Hicks, L. E., forest ranger, U. S. F. S.
 Hill, F. C., forest ranger, U. S. F. S.
 Hirst, E. C. (Yale For. School, '09), state for., New Hampshire.
 Hogentogler, Joseph R. (Mt. Alto, '12), Pa. Dept. For.
 Holt, Felix R. (Yale For. School, '02).
 Hotze, E. B. (Uni. of Mo.).
 Hope, L. S. (Yale For. School, '16).
 Hout, William E. (Mt. Alto, '09), 20th Eng. (Forest), formerly Pa. Dept. For.
 Houtz, Jesse (Mt. Alto, '13), Field Artillery, formerly Pa. Dept. For.
 Huff, Rolland, forest ranger, U. S. F. S.
 Hull, J. H. (Yale For. School, '11).
 Humphrey, J. C. H. (Yale For. School, '09).
 Hussey, Ralph W., forest ranger, U. S. F. S.

INGALLS, E. E. (Yale For. School, '17).
 Inskip, Raymond P., forest ranger, U. S. F. S.
 Isola, Vico C. (Yale For. School, '14).
 Irwin, James A. (Mt. Alto, '12), Sergt. 10th Eng. (Forest), formerly Pa. Dept. For.

JANOUGH, Karl L., forest ranger, U. S. F. S.
 Johnson, O. S., Sgt. 20th Eng. (Forest) (Uni. of Minn., '16).
 Jones, E. F., forest examiner, U. S. F. S.
 Jones, Luther G. (Yale For. School, '16).
 Judson, Luchard (Yale For. School, '17).

KELLEY, Evan W., Capt. 10th Eng. (Forest), forest examiner, U. S. F. S.
 Ketcham, Louis, forest ranger, U. S. F. S.
 Keyes, John H., 20th Eng. (Forest), (Yale, '14).
 Ketrledge, John C., forest examiner, U. S. F. S.
 Kiefer, Francis, Capt. E. O. R. C., asst. dist. forester, U. S. F. S.
 Kimball, George W., forest examiner, U. S. F. S.
 King, Robert F., 2nd Lt. Coast Artillery (Uni. of Wash., '19).
 Kingsley, Ray M., forest ranger, U. S. F. S.
 Kittredge, Joseph, Jr., forest examiner, U. S. F. S.
 Klobucher, F. J. (Yale For. School, '16), forest ranger, U. S. F. S.
 Knowlton, H. N., engineer in forest products, U. S. F. S.
 Kobbe, William H. (Yale For. School, '04).
 Koomey, L. H. (Yale For. School, '12).
 Kraebel, Charles J., forest assistant, U. S. F. S.
 Kraft, F. G. (Uni. of Mo.).
 Krause, John E., forest ranger, U. S. F. S.

LAFON, John, Capt. 10th Eng. (Forest), Forest Branch B. C.
 Larzon, Arthur K. (Uni. of Wash.).
 Lee, Chester A. (Yale For. School, '17).
 Leach, Walter (Mt. Alto, '14), 314th Inf., Pa. Dept. For.
 Lentz, Gustav H. (Yale For. School, '17).
 Lewis, Ferry D., forest ranger, U. S. F. S.
 Lindsey, Eugene L., 1st Lt. 10th Eng. (Forest), (Yale For. School, '19), forest examiner, U. S. F. S.
 Littlefield, Theron R., forest ranger, U. S. F. S.
 Loveman, A. M. (Yale For. School, '16).
 Lowermilk, Walter C., forest ranger, U. S. F. S.
 Lundgren, Leonard, Captain, engineer, U. S. F. S.
 Luther, T. F., 20th Eng. (Forest), (Cornell, '17).

MACKECHNIE, A. R., 2nd Lt. U. S. A. (Uni. of Wash., '18).
 Malmstein, Harry E., grazing assistant, U. S. F. S.
 Mackworth, G. D. (Yale For. School, '17).
 Marsh, A. Fletcher (Yale For. School, '11).
 Masch, Walter (Mt. Alto), 20th Eng. (Forest), Pa. Dept. For.
 Mason, David T., Capt. 10th Eng. (Forest), Uni. of Cal. (Yale For. School, '07).

McCullough, Thomas E. (Yale For. School, '11).
 McGillicuddy, Blaine (Uni. of Wash.).
 McGlaughlin, Eugene R., 20th Eng. (Forest), (Ohio State Uni.).
 McKnight, Roscoe, 1st Lt. 10th Eng. (Forest), U. S. F. S.
 McNulty, L. Edgar (Mt. Alto For. Acad., '17), Co. C., 10th Eng. (Forest), Pa. Dept. For.
 McPherson, Benj. D. (Mt. Alto For. Acad., '16), 10th Eng. (Forest), Pa. Dept. For.
 Meek, Chas. R. (Mt. Alto, '12), 20th Eng. (Forest), Pa. Dept. For.
 Mendenhall, Fred D., surveyor-draftsman, U. S. F. S.
 Meyer, Leo W. (Yale For. School, '17).
 Middour, Joseph C. (Mt. Alto For. Acad., '16), Co. C., 10th Eng. (Forest), Pa. Dept. For.
 Miles, Clark, forest examiner, U. S. F. S.
 Millar, W. N., Capt. 10th Eng. (Forest), (Yale For. School, '08).
 Miller, Edwin B. (Mt. Alto For. Acad., '17), 10th Eng. (Forest), Pa. Dept. For.
 Miller, Fred H., forest ranger, U. S. F. S.
 Minner, Clifford R., forest ranger, U. S. F. S.
 Moir, W. Stuart (Yale For. School, '17).
 Montgomery, Ray C., forest ranger, U. S. F. S.
 Montgomery, W. E. (Mt. Alto, '13), Res. Off. Tr. Camp, Augusta, Ga., Pa. Dept. For.
 Moore, Barrington, Capt. (Yale For. School, '08), U. S. F. S.
 Moore, W. M., forest examiner, U. S. F. S.
 Morton, J. Newton (Mt. Alto For. Acad., '16), Co. C., 10th Eng. (Forest), Pa. Dept. For.
 Mosch, Walter (Mt. Alto) 20th Eng. (Forest), Pa. Dept. For.
 Murphy, E. C., 2nd Lt., U. S. A. (Uni. of Wash., '20).
 Murphy, R. A. (Yale For. School, '17).
 Mutz, George, forest ranger, U. S. F. S.
 Myers, Frank B., forest assistant, U. S. F. S.

NELSON, Enoch W., grazing assistant, U. S. F. S.
 Nelson, Oscar L., forest ranger, U. S. F. S.
 Nevitt, John V., forest ranger, U. S. F. S.
 Neasmith, John J., 20th Eng. (Forest), (Syracuse, '17).

OAKLEAF, H. B., forest examiner, U. S. F. S.
 Odell, W. T. (Uni. of Wash., '12).
 Oliver, J. Earl, forest ranger, U. S. F. S.
 Oles, W. S., 20th Eng. (Forest), (Cornell, '16).
 Orr, Ronald H., 20th Eng. (Forest), (Biltmore For. School, '09).

PAETH, William J. (Yale For. School, '12), forest assistant, U. S. F. S.
 Paine, F. R. (Yale For. School, '14).
 Paine, Topliff O., forest ranger, U. S. F. S.
 Paxton, Percy J. (Yale For. School, '09), forest exam., U. S. F. S.
 Peck, Allen S., Major, 10th Eng., '09, forest insp., U. S. F. S.
 Peck, E. C. (Yale For. School, '18).
 Pilcher, Rufus J., forest ranger, U. S. F. S.
 Plummer, Donald (Uni. of Wash., '20).
 Port, Harold F. (Mt. Alto For. Acad., '16), Co. A., 10th Eng. (Forest), Pa. Dept. For.
 Porter, O. M. (Yale For. School, '15).
 Powell, Harry A., British Army, (Uni. of Wash.).
 Powers, James E. (Mt. Alto, '15), Artillery, Pa. Dept. For.
 Powers, Victor S. (Uni. of Wash., '18).
 Prichard, R. P. (Yale For. School, '09).
 Pryse, E. Morgan, forest assistant, U. S. F. S.

RAINSFORD, W. K. (Yale For. School, '06).
 Ramsdell, Willett F., deputy forest supervisor, U. S. F. S.
 Rase, Frederick W., surveyor, U. S. F. S.
 Rand, E. A., 1st Sgt., 20th Eng. (Forest), (Uni. of Me., '14).
 Riblett, Carl H., forest ranger, U. S. F. S.
 Richards, E. C. M. (Yale For. School, '11).
 Ricketts, Howard B., clerk, U. S. F. S.
 Ringland, Arthur C., Capt. 10th Eng. (Forest), (Yale For. School, '05), forest inspector, U. S. F. S.
 Rixson, C. L., forest clerk, U. S. F. S.
 Roberts, Wesley K. (Uni. of Wash., '18).
 Robertson, Colin C. (Yale For. School, '07).
 Robinson, S. E. (Yale For. School, '12).
 Rockey, K. E. (Yale For. School, '12).
 Roeser, Jacob, Jr., forest assistant, U. S. F. S.
 Root, Lloyd (Mt. Alto For. Acad., '17), Co. C., 10th Eng. (Forest), Pa. Dept. For.
 Rowland, Arthur L. (Mt. Alto), Pa. Dept. For.
 Rowland, Horace B., Jr. (Mt. Alto For. Acad., '15), Co. F., 10th Eng. (Forest), Pa. Dept. For.
 Rush, William M., forest ranger, U. S. F. S.
 Russell, Joseph P. (Uni. of Wash.).

SADLER, George M., forest ranger, U. S. F. S.
 Salton, Robert C., forest ranger, U. S. F. S.
 Sanford, E. C., 1st Lt., 10th Eng. (Forest), forest supervisor, U. S. F. S.

Sanger, Owen J., 1st Lt. Canadian Contingent (Uni. of Wash.).
 Schaefer, Oscar F., forest ranger, U. S. F. S.
 Schmaelzle, Karl J. (Uni. of Wash.).
 Schmitz, Henry (Uni. of Wash., '15).
 Schowe, William A., forest ranger, U. S. F. S.
 Scofield, William L. (Yale For. School, '13), for. rang., U. S. F. S.
 Segur, Lewis L., forest ranger, U. S. F. S.
 Seltzer, J. W., 2nd Lt., 10th Eng. (Forest), (Pa. State For. Acad., '09), forester N. J. Zinc Co.
 Senft, Walter M. (Mt. Alto), Pa. Dept. For.
 Sheeler, George W. (Mt. Alto, '12), Co. C., 502d Service Bat., Pa. Dept. For.
 Shepard, H. B., 2nd Lt., 10th Eng. (Forest), forester Lincoln Pulp Co.
 Shenefelt, Ira Lee (Mt. Alto, '16), Co. C., 502d Service Bat., Pa. Dept. For.
 Siggins, Howard W. (Mt. Alto For. Acad., '14), Co. C., 10th Eng. (Forest), Pa. Dept. For.
 Silcox, F. A. (Yale For. School, '05), district forester, U. S. F. S.
 Skeels, Dorr, Capt. 10th Eng. (Forest), Uni. of Montana.
 Slomaker, L. Vernon, telephone engineer, U. S. F. S.
 Smith, A. Oakley (Yale For. School, '14).
 Smith, Edwin F., forest ranger, U. S. F. S.
 Smith, E. H., 1st Lt. 316th Inf., Pa. State Forestry Dept.
 Smith, Edward S. (Mt. Alto, '16), Nat. Army, Camp Meade; Pa. Dept. For.
 Smith, H. A. (Mt. Alto, '16), Field Hospital Ser., Pa. Dept. For.
 Stadden, Robert W. (Mt. Alto, '14), 20th Eng. (Forest), Pa. Dept. For.
 Speers, Vincent E., forest clerk, U. S. F. S.
 Speidel, H. A. (Yale For. School, '14).
 Staebner, R. C.; eng., Little River Lumber Co., Townsend, Tenn.
 Stanton, L. G. (Uni. of Wash., '18).
 Stevens, Carl M. (Yale For. School, '12).
 Stewart, Clifford H., forest ranger, U. S. F. S.
 Stewart, Jefferson M., clerk, U. S. F. S.
 Stone, Everett B. (Yale For. School, '17).
 Stuart, R. Y., Capt., forest inspector, U. S. F. S.
 Stults, Hal L., forest ranger, U. S. F. S.
 Swapp, Roy, forest ranger, U. S. F. S.
 Sweeney, Joseph A., forest ranger, U. S. F. S.
 Sweeney, Michael J., forest examiner, U. S. F. S.

THOMPSON, Jackson (Uni. of Wash., '16).
 Thompson, Raymond H., forest ranger, U. S. F. S.
 Tweedy, Temple (Yale For. School, '14).
 Thomas, Harry L., Co. C., 10th Eng. (Forest), for. rang., Pa. Dept. For.
 Thomas, John, 10th Eng. (Forest), for. rang., Pa. Dept. For.

VAN WICKLE, J. M. (Uni. of Wash.).
 Van Arsdall, Howard (Mt. Alto), Pa. Dept. For.
 Voight, Alfred W., forest ranger, U. S. F. S.
 VanHorn, Harry E. (Mt. Alto For. Acad., '14), Co. A., 10th Eng. (Forest), Pa. Dept. For.

WAGNER, G. C., Jr. (Yale For. School, '18).
 Walsh, Harry A., Capt. Quartermaster's Dept., U. S. F. S.
 Ward, Herbert S., clerk, U. S. F. S.
 Weitknecht, Robert H., forest assistant, U. S. F. S.
 Wells, Arthur B. (Mt. Alto, '11), 18th Machine Gun Co., Pa. Dept. For.
 Westfeldt, W. O. (Yale For. School, '16).
 White, Martin E., forest ranger, U. S. F. S.
 White, William E., forest examiner, U. S. F. S.
 Wilcox, J. M., Corporal Inf. (Uni. of Wash., '20).
 Williams, Hubert C., 1st Lt. 10th Eng. (Forest), (Yale, '08).
 Willson, Stanley F. (Yale For. School, '14), for. rang., U. S. F. S.
 Wirt, William (Uni. of Wash., '18).
 Wisner, — —, Corp. 20th Eng. (Forest), (Syracuse, '17).
 Wohlenburg, E. F., 2nd Lt., 10th Eng. (Forest), forest examiner, U. S. F. S.
 Wolfe, Kenneth, forest ranger, U. S. F. S.
 Wolfe, Stanley L., 1st Lt., U. S. F. S.
 Woolsey, Theodore S., Jr. (Yale, '02); designated as timber negotiator in France.
 Woodruff, James A., Lt. Col. 10th Eng. (Forest).
 Woods, J. B., 1st Lt. 10th Eng. (Forest).
 Work, Herman, 1st Lt. 10th Eng. (Forest), deputy forest supervisor, U. S. F. S.
 Wulff, Johannes (Yale For. School, '17).

YEOMANS, E. J. (Yale For. School, '12), for. rang., U. S. F. S.
 Young, L. P., 2d Lt. Inf. (Uni. of Wash., '17).

ZELLER, R. A., forest assistant, U. S. F. S.
 Zieger, Robert H., forest ranger, U. S. F. S.
 Ziegler, E. A., Capt. Coast Art., Direc. Pa. State For. Acad.

FORESTRY AT BATES COLLEGE

UNDER the will of Benjamin C. Jordan, of Alfred, Maine, Bates College, of Lewiston, Maine, received a legacy for the development of a Department of Forestry. There were conditions under the will, as there were various legatees, including daughters of Mr. Jordan, and there were numerous obligations to be met before any part of the legacy would be available. The various outstanding obligations have now been met. A daughter of Mr. Jordan, under the terms of his will, was to be the recipient of all the income of the estate that might accrue when all debts had been paid. She is a graduate of Bates and in loyalty to her alma mater has relinquished a share of her income in order that her father's wishes might be carried out as early as could be found practicable.

Mr. Jordan had been for many years a trustee of Bates and one of his brothers is the head of the Department of Chemistry at the college. The college will ultimately have large resources for its forestry work, but for a few years the amount available will be only moderate. It does, however, permit the college to employ a thoroughly prepared man to take charge of the department. It also affords the requisite laboratory facilities. The amount available for this department is likely to increase from year to year. The estate of Mr. Jordan included some 14,000 acres of good timber land, situated in different counties in Maine.

President George C. Chase writes AMERICAN FORESTRY that Bates is now endeavoring properly to correlate her educational work in forestry with other work in such a way as to give a good knowledge of forestry to students interested in this subject and, at the same time, to assure to them a reasonable degree of culture and breadth of knowledge.

CHANGES AT THE GEORGIA STATE FOREST SCHOOL

SINCE it was necessary to divide the work left by the men who had been called under the draft at the State Forest School of the University of Georgia, at Athens, the Forest School has been combined with the division of plant pathology. Most of the efforts at the school during the period of the war will be directed toward a control of plant diseases, supplemented, of course, by a certain amount of work in forestry. Two projects have been approved, one of which provides for a field agent in forestry and plant pathology, and the other for a specialist in plant pathology. Under the first, Mr. James Godkin, who had his undergraduate work at Connecticut and his graduate work at the Michigan Agricultural College, has been appointed. An arrangement has been made with Dr. Humphrey, of the Office of Cereals, for the stationing of six specialists within the State, whose sole work will be the control of cereal diseases, and there will be full and cordial co-operation between the State and the university in the conduct of this work. It is now confidently expected that the coming year will see at least a dozen men specializing in plant pathology at work within the State, the result of whose labors will be of great benefit and value.

TREE'S LONG JOURNEY ON TRUCK

IN tree transplanting the motor truck has made itself known as a factor of real importance. Experience has demonstrated that by using trucks in this work the undertaking is greatly simplified and the results enhanced. In the accompanying illustration is shown one stage of a recent tree moving operation which shows how a truck may be used to good advantage. The tree was an excellent spe-



cimen of oak, forty feet in height and 13 inches in diameter. The trip made by this oak was from its native nursery, near Philadelphia, to the estate of Eugene Du Pont, at Greenville, Delaware, a distance of 42½ miles. The tree was lifted from the ground with its roots encased in a ball of earth weighing approximately 8,500 pounds. The weight of tree and rigging was estimated at 2,000 pounds, making a total weight of 10,500 pounds. The tree was loaded and unloaded without injury and the trip was made without mishap of any kind. The success of the undertaking has convinced those concerned that the use of the motor truck in tree removal opens up new possibilities for transplanting.

AN Omaha chemist is experimenting with the roots and stems of manzanita, a common shrub which forms a part of the chaparral on the Pacific Coast, as a source of dye. A carload of the wood has recently been shipped from Northern California for this purpose.

THE annual value of the farm woodlot products of the United States is \$195,000,000.

THE PINE

BY MABEL
POWERS

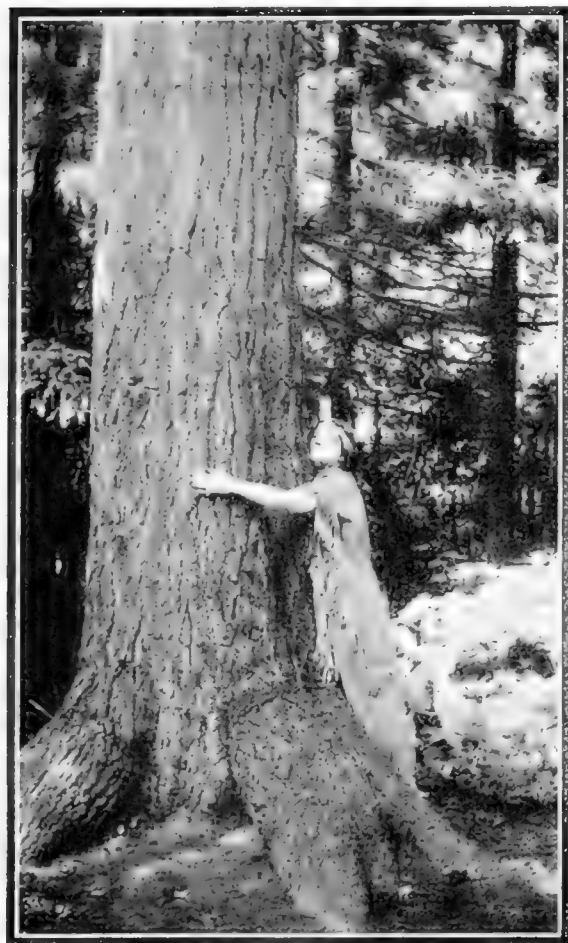
(Y e h s e n n o h w e h s - - - O n e W h o T e l l s t h e S t o r i e s)



AND thus spake Osoah, the Pine, unto me in the Land of the Mohawks.

In Nature's law only is there freedom, strength, content. I know for I have kept Her Law.

I am Osoah, the Pine, Myself--the Guide of the Forest. I point the way to men. Harken unto my voice, observe my signa and take to the Great Sky Road.



From my topmost branches thou may'st determine thy direction and keep the needle of thy soul pointing true north.

When the sun sleeps and the cloud blanket drops low, from me can'st thou learn where the east trail winds and the west trail leads. Look to my towering crest.

Wound me, bruise me and I will pour the balm of my love upon thee. In the breath of my spirit may'st thou find healing and peace.

Always my arms are outstretched to welcome and bless thee, the great heart of my tree trunk yearneth for thee. Summer and winter, in sunshine and storm, yea in all seasons and weathers, I stand strong, steadfast, unchanged, the same.

In cities distant, in the maddening whirl of self and things, my call ever com'st to thee.

As in a dream thou hear'st my low-breathed love murmurs and seekest me as the young the brooding mother bird.

Again and again shalt thou return, sit at my feet--and listen until thou too become steadfast, true, Thyself, in love and truth fulfilling the law.

The Sky is not far! Osoah the Pine hath spoken, and hath pointed thee, the Great Sky Trail!

"DOCTOR MOUNTAIN"

BY MARK DANIELS

FORMER GENERAL SUPERINTENDENT OF NATIONAL PARKS

SOME true friends of old Daniel Grogan, whose machine shop had of late been failing to pay dividends, finally persuaded him to take a trip to the mountains. They had called at his office one day and told him he was going with them to the Sierras, where health and happiness lie.

"Go on wid ye! It's you boosters that do most av the lyin'," he said, and slid farther down into his chair thereby bringing a recently acquired embonpoint into more or less violent contact with the corner of the table.

Perhaps it was the whispered expletive which gave them the cue, for they finally succeeded in persuading Mr. Grogan that a trip to the mountains would not only take a load off his feet but off his mind as well, for he had been failing to outwit his competitors for some time, and it worried him. A few days later, three of them emerged from a grove on the north side of the Valley and stood, breathless, before the indescribable majesty of the Falls of the Yosemite.

Grogan slowly removed his hat and above the roar of the Falls were heard the words, "Great God Almighty!" in Grogan's ringing bass. The three

stood reverently for several minutes before those crashing falls, that towered like a pillar of purity a half mile above them—and then silently walked away.

For the next ten days Daniel Grogan was seen in early morning and at sunset on the trails and in the canyons, on the mountain peaks and below the roaring falls, by the placid lakes and beneath the towering sequoias; a silent and thoughtful man.

When the time came to leave he wrung the Superintendent's hand.

"I've seen but a bit of Yosemite Park. But I've seen yure river on ind, yure half dome skyscraper, and yure trees that are so big ye can only see 'em in yure dreams, and

I've got more inspirations out av thim than are in two ingine boilers full o' highballs. I'm going back to Frisco, too, an' build a machine shop that'll make more noise



THE GLORIOUS BEAUTY OF THE YOSEMITE NATIONAL PARK—THE UPPER FALLS

Truly has it been said: "I will open rivers in high places and fountains in the midst of the valleys"—and many there are who can bear witness to the wonderful healing brought to sick bodies and jaded nerves through the medium of inspiration found here.

than yure upinded river, the difference bein' that there'll be no wather in it, save for me own drinkin', which same'll be all I'll be drinkin' this day forth."

As to his success in fulfilling his promises, it may be said, in passing, that upon his death he left an estate of such size that the income from it pays the traveling and other expenses of his two progeny, who annually go abroad for mountain scenery.

Mr. Grogan found, as others have found and others will ever find, that health of body is only one of the rewards of travel in the rugged mountains. There is the effect upon the mind, the imagination—upon the soul, as well.

The statements of the doctors, that a trip to the mountains each year will keep us in better health, has lost its punch. The fact that the capacity to resist the inroads of disease and the lure of the fleshpots decreases inversely, as the square of the waist measure has lost its terrors. So long as the business is running along smoothly and the tango tea is popular, why worry about the increasing pressure of the waistcoat? Why heed the cry of wolf? But it frequently occurs that the business ceases to run so smoothly, and all efforts fail to bring imagination, inspiration and ingenuity to the rescue. Here is a pure case for the mountains.

There is no doubt that certain of our mental faculties become sluggish through disuse. Few men can follow, for many years, the humdrum existence of daily business life, and retain all their mental faculties in healthy, active condition. Generally it is the imagination which flags first. When this condition comes on, what is needed is a

shock, such as Mr. Grogan received when Yosemite Falls burst upon his view. It is a sort of mental shower, acting upon the mind much as a cold plunge after the steam room acts upon the body.

The high mountains give you just this, and more. After your dormant faculties have been shocked into life by their stupendousness, they present you, on every side, with sublimity, magnificence and grandeur that

stimulate the imagination and rejuvenate ambitions. It is a serious case, indeed, which does not return, after a three-week treatment with Nature's mental glove stretcher, filled with new ideas and fired with the ambition to carry them out.

I was once working up the trail that leads along Bubbs Creek from King's River Canyon to Kearsarge Pass, on the summit of the high Sierra of California. There is a climb of about 8,000 feet from the floor of the canyon to the summit, but the view from the top is worth the climb. The crest of the Sierra Nevada in this vicinity is an endless line of jagged peaks and minarets which, silhouetted against a sapphire sky, appear as sharp as saw teeth. These mountains rise more or less gradually from the west to an elevation between 13,000 and 14,000 feet, and, as if satisfied



HERE IS FOUND REST AND PEACE. THE STILLNESS OF THE WATER AND THE QUIET OF THE HILLS

Not all the Alpine scenery of this continent is to be found in the Northwest. Colorado and the Rocky Mountain National Park boast of some of the best that we have, which claim attention on the ground of propinquity as well as for their native beauty.

with having reached the highest elevation in the United States, drop off abruptly to an elevation 3,000 to 4,000 feet above sea level.

As we approached the summit, a motionless figure was distinguished, sitting upon a rock on the very edge of the Divide. He was so still that he seemed a part, as he was in color, of the brownish-grey rocks of this edge of

the earth. Ignoring me in a manner that stamped me as a tenderfoot, he asked Pete, the packer, if he had any "chewin'."

Pete silently handed him a plug of tobacco, that all but disappeared behind the hairy front, which immediately and silently began working upon the biggest chew of tobacco I have ever seen taken. He deigned no reply to Pete's remark that he might better have kept the plug and returned the chew, nor gave any sign of gratitude, save by a slight moisture in his sun-reddened, grey eyes. The silence, for some minutes, was broken only by the hiss of tobacco juice as he spat at a small rock that seemed particularly placed by nature as a target. Finally, this sort of chewing sphinx apparently felt that he had reduced his hunk of "miners' candy" to a constituency that justified letting up on the helpless thing for, as I was about to frame a question, he turned to me and said:

"Son, I've got a mine about a mile lower down and it's good, if anyone can figger a way to git machinery in and ore out of 'er. On my way up, I lost part o' my pack and all o' my terbaccy. While I was a-sittin' here, tryin' ter decide whether ter go back for terbaccy an' another whirl at the old mine, a idea struck me. Settin' on top o' the world here, where you kin look straight

down about two mile, sorter wakes a feller up an' a settin' here, I figgered how I could work that ole mine. All I needed then ter make this view perfect, was a plug o' Honey Dip Twist."

Pete reminded him that he was chewing on a hog's share of one at that moment.

"Sure," he said. "I guess this is my lucky day. If those desert rats 'd run up here oncet in a while, I b'lieve they'd git enough ideas ter make them Bodie Mines pay big. You see, up here, you're two or three mile nearer God," (pointing to the Owens River, 10,000 feet below, which looked like nothing so much as a fine silver thread reaching toward Death Valley, over 14,000 feet below us), "and mebbe that's how come these idee's so fresh and easy like."

We talked about mines and mountains, and left him adjusting the pack to a tiny burro which had been nodding in the shade of a huge boulder. All thoughts of this curious philosopher were banished by the glorious scene over the Owens River Valley, as we followed the trail that led down, down, down, to the little town of Independence.

During the last half mile of descent the rays of the setting sun and the shadow of the range we were on slowly crept up the Panamints until only the tops were



FISH CREEK CANYON, APACHE TRAIL, ARIZONA

The canyons of Arizona seem to have supplied the colors of the world in making. Purples, greens, blues, scarlets and tawny browns shift and play with kaleidoscopic variety as the sun passes overhead.



THE WONDERFUL COWLITZ GLACIER, IN RAINIER NATIONAL PARK

This spot, one of the best loved by the tourist in the National Parks, shows the Cowlitz Glacier, one of the few presenting the actual appearance of having flow lines. It is one of a system of ninety or so glaciers that mantle one of the most noble mountains of the earth.



HERE WE FEEL THE VEIL OF MYSTERY SHROUDING THE LIVES OF A FORGOTTEN RACE

These are the Tonto Cliff Dwellings in Arizona. About three hundred feet in the Roosevelt Dam are two groups, one of which is shown in this photograph. An automobile may be driven to within a few hundred yards of them. Nothing that the Forest Service has taken up in the way of preservation in this vicinity has met with more approval on the part of the residents of the district than its announcement that these ruins are to be repaired and set aside.

bathed in a russet glow which seemed to remain for a spell, to be suddenly snuffed out, leaving us, as we emerged onto the valley floor, to follow the trail by the moon's pale light.

Four years later, as I was walking along the Beach Drive in San Francisco, I noted an automobile of considerable wheel base and style standing beside the road. Approaching it, I recognized the old miner, though his flowing white beard was now neatly trimmed a la Van Dyke, and his battered Stetson had given way to one with a pretentious brim and neatly creased top. He recognized me at once and extended a cordial hand which had lost little of its grip. We chatted a while, and I finally asked him if his mine worked out as a result of his inspiration on the summit.

"Son," he said, "this outfit is mine. I'm payin' that driver by the month an' I've got a diggings on Blank avenue, with two wranglers an' a cook. Some day I'm goin' back on them mountains to see if I kin git another idee how to spend some o' the money I'm gettin' from that mine."

Why do not more people take the soul cure in the mountains?

Perhaps it is because they do not believe in it or do not approach the mountains in the spirit of appreciation.

It is as necessary that one be in a receptive frame of mind in traveling on the top of the world as elsewhere, to get the benefits from association and contemplation. The chances are, however, that comparatively few know what they are, where they are, or where to get to them. If our

National Parks were within the borders of an European country, their glories would be emblazoned upon the waiting-room walls of every railroad station on the continent, and many in this country; for, in Europe, they have learned that scenery is a natural resource, like many other of nature's products.

It might further be stated that the several hundred millions of dollars which under normal conditions leave this country annually with the tourist travel to Europe, would very likely be doubled.

It is true that many go to Europe to acquaint themselves with the habits and customs of a foreign people;

but not all that go there. Nor is this the cause of so few visiting our own unequalled scenery.

Most people simply do not know what we have here. How many have heard of Sequoia National Park, with the bluest sheet of water in the world nestling in the great crater of an extinct volcano, or of Mesa Verde National Park, with its canyons and mysterious cliff dwellings, each one an elixir of life for a sinking spirit?



CLIFF DWELLINGS, CHERRY CREEK, SIERRA ANCHA, APACHE TRAIL, ARIZONA

The great Southwest adds the lure of mystery, antiquity and romance to her scenic attractions. The remaining ruins of three distinct races are scattered throughout central Arizona. The Cliff Dwellings in the Cherry Creek Canyon country in the vicinity of Roosevelt are amongst the finest in the United States, and have attracted many noted archaeologists.



THE SPIRIT OF A LONG GONE AGE STILL INVESTS THIS SPOT WITH BEAUTY AND ROMANCE

In Apache land, near Roosevelt, there is a canyon named Pueblo, which is a thousand feet deep or more. Near its source the gorge is so narrow that a stone can be thrown from one wall to another, and here the ancient Cliff Dwellers built their homes in great caverns that gave out on similar caves across the canyon. Among these crumbling ruins, which still speak strongly of the lives they sheltered, one feels most keenly the mystery of a race forgotten, long vanished from the earth.

We struggle for gain and advancement, and the success attained is generally at the expense of bodily health and spiritual vision. "What shall it profit a man, if he shall gain the whole world and lose his own soul?"

And yet, if there is merit in the contention that environment is a potent factor in man's development, how shall he save it from shrinking unless he sometime walks out of the sordid city streets into the open spaces where he can see and think in three dimensions?

If the body is afflicted with disease we may have re-

course to the family physician; but if the soul is sick go to the mountain. He is a soul doctor. He will purge you with the sight of yawning chasms, lofty towering peaks and cliffs, and when your reeling senses have settled down to the correct realization of proportion and the relative importance of things, he will nurse you through spiritual convalescence with azure skies, sapphire lakes, scented forests, mountain meadows, tumbling cascades, and the health-giving ozone that God gave, to be breathed by man created in His image.

STATISTICS compiled by the National Lumber Manufacturers' Association show that during the 12 months ending July 31 the mills reporting cut 15,602,000,000 feet of lumber and shipped 15,741,000,000 feet, or 8.9 per cent more than production. Shipments for the first seven months of this year were 7.7 per cent more than last year, with no increase in cut. During July of this year 732 mills in all parts of the country and operating in all kinds of timber, cut 1,339,000,000 feet and shipped 1,566,000,000 feet, or 12.7 per cent more than production. The cut in July this year was 1.3 per cent less than July last year, with shipments 19.3 per cent greater.

AFTER generations of protection from the ax of woodsmen, thirty-five acres of fine old oak trees near Whig Lane, New Jersey, have been dedicated to the building of the Government's Emergency Fleet. Many of the trees reach a height of 60 to 70 feet and they are supposed to be from 150 to 200 years of age. The land on which they grow has been in the Richman family since the early settlement of Western New Jersey. It was only with the need of the United States for timber for shipbuilding that the consent of the family was obtained for cutting the trees. The largest oaks are cut into big beams and material for keels. A yield of 2,000,000 feet of lumber is expected.

THE NUTHATCHES AND THE CHICKADEES

(Families Sittidae and Paridae)

BY A. A. ALLEN, PH.D.

Assistant Professor of Ornithology, Cornell University.

CLOSELY related and formerly placed in one family (*Paridae*), the nuthatches and the chickadees are associated in more than name, for after the nesting season, they gather in loose flocks and spend the cold winter months together. Seeming to enjoy their company, other winter birds often follow them, so that when one hears the *yank-yank* of the nuthatch and the scolding *chick-a-dee-dee* of the chickadee, he may look also for the slender brown creeper winding its way up the bole of the tree, the downy and hairy woodpeckers, the golden-crowned kinglet, and often for a merry troop of tree sparrows. Not only are they sociable among themselves, but for mankind they seem to have little fear, and gather about suburban dwellings wherever food is offered them. Except in northern Canada, most species are non-migratory and spend the winter in the vicinity of their summer homes. If one wishes to have them about the garden all through the winter, he should begin putting out sunflower seed and pieces of suet, as directed in AMERICAN FORESTRY, December, 1915, in October or November, because it is at this time that their numbers are increased by the visitors from the North, and where they find an abundant food supply they are apt to remain all through the winter. When one has been feeding the birds for several seasons, there is every reason to believe that the same birds return year after year to the same feeding stations, just as it is known that they return to the same nesting spots. Members of the American Bird Banding Association, as reported by the secretary, Mr. H. H. Cleaves, have placed bands on the legs of several species of birds trapped at feeding sta-

tions during winter, and have recaptured the same birds in the same traps the following winter. The author has placed bands upon the legs of chickadees and nuthatches coming to his window during the winter and has had the same birds nesting in the vicinity the following spring and bringing their young for food to the same window the following fall.

The garden in which sunflowers have been planted will do more than anything else to attract the nuthatches and chickadees because both are more fond of these seeds than anything else. The sunflowers can be left standing or the seed can be used at the window shelf

with equal effective results. The oils in the sunflower seed and the fat of the suet seem to take the place of insects, for both birds are insectivorous, and when not actually at the feeding shelf spend their time gleaning about the trees for hibernating larvae and insect eggs. During the summer they feed almost altogether upon insects and it is, therefore, very much worth while to expend the little



A WINTER CHICKADEE

If you'd like to have them stay with you all winter, just provide plenty of seed and suet, for snow and ice hold no terrors for this winter sprite, but food must be provided.

effort necessary to entice them to the home grounds.

There are 241 species in the chickadee family, found in most parts of the world except South America and the Pacific Islands, but most abundant in the northern hemisphere. In North America there are but fifteen species represented, extending southward into the mountains of Mexico. Of these, six species are known as chickadees, four as titmice, three as bush-tits, one as a wren-tit, and one as a verdin, but all are alike in being small fluffy birds with long tails and sharp, pointed bills. The chickadees are dull grayish birds, lighter below, with conspicuous black crowns and throat patches. The Hud-

sonian chickadees, of the Far North and the mountains of Northern United States, which come southward in winter irregularly, have the top of the head brown rather than black, and the mountain chickadees of the Rocky



"IN UNION THERE IS STRENGTH." MORE POWER TO 'EM!

Chickadees and nuthatches are associated in more than name. After the nesting season they assemble in loose companies and make common war upon hibernating insects—and here they are, hard at it.

Mountain region have a white stripe over the eye, but all six species are easily recognized by anyone familiar with the common chickadee. In fact, the Carolina chickadee, of the Southern States, is so similar in appearance to the common chickadee that it can scarcely be distinguished from it in the field. The songs and call-notes of the different species vary considerably but all have a common likeness. The scolding call of the common species gives the name to the family, for it is a clearly enunciated *chick-a-dee* or *chick-a-dee-dee*. In other species it is less clear, more highly pitched, or more nasal. In addition to this note, the chickadee has a song of two or three sweet whistles resembling the syllables *phc-be* or *phc-be-be*, so exactly that amateur bird students are often led to believe that it is a phoebe calling. Also, as the chickadees troop through the woods, they have a variety of conversational notes rather difficult to describe. When protecting its eggs or young, the chickadee utters a hissing or sputtering sound, if disturbed, which is sufficient to discourage any unsophisticated

squirrel from further investigation of the contents of the hole.

During March and April the flocks break up and pairs of chickadees can be seen prying about decaying stubs or old woodpecker holes looking for a place to build their nests. Even though their small bills do not seem adapted to chiseling, they usually find a stub sufficiently decayed for them to excavate their own cavities. During recent years, however, they have come more and more to accept bird houses such as those built for wrens. At the bottom of the cavity they build a warm nest of vegetable fibers, moss, plant down, wool, etc., and lay often as many as nine tiny speckled eggs. What is more remarkable, they often succeed in rearing all nine youngsters.

In spite of the fact that they begin selecting their nesting site in March or April, the eggs are not laid until May, but the young are out of the nest early in June, giving them time for another brood, which, however, is usually smaller than the first.

The chickadees are friendly, inquisitive birds and it is not only at the winter feeding stations that they become



BRACELETS FOR BIRDS

Aluminum bands, such as this one on the leg of the nuthatch, are proving that some birds winter in the same spot every year as well as that they return to the same place to nest. Likewise, they have shown that in most places chickadees and nuthatches do not migrate.

tame. They are always ready to answer an imitation of their *phc-be* call and will come flying through the woods to greet the traveler, perching on the branches above his head, sometimes even dropping to his shoulder or hover-

ing a few inches in front of his face in a vain endeavor to discover the whereabouts of the other chickadee.

The titmice, as the name is now restricted, differ from the chickadees in having the crown feathers elongated in the form of a crest. The tufted titmouse of the East and the plain titmouse of California and Oregon are the best known species, the other two being Mexican, and coming into the United States only in Texas and Arizona. The tufted and the plain titmice are uniformly gray, a trifle larger than the chickadees, but with the same cute ways

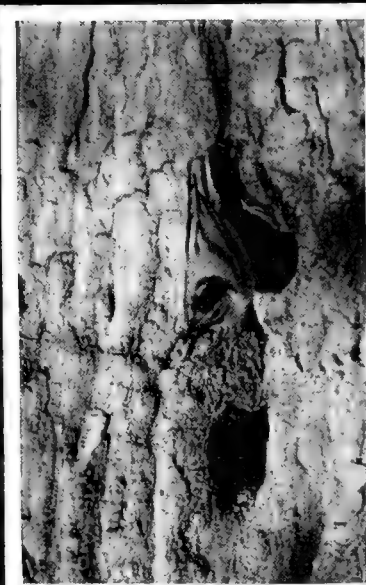
of flitting about the outer branches, hanging upside down, peering under leaves, and ex-

Like the chickadees, the nuthatches are largely confined to the Northern Hemisphere. There are about seventy species, of which only four are found in North America. They are bluish-gray birds, brighter than the chickadees, with white or rusty underparts, and with the top of the head brown or black. The chief characteristic of the nuthatches is their habit of climbing the trunk and larger branches of trees in search of insects, upward or downward with equal facility. Unlike the woodpeckers, they do not use the tail as a prop, nor are their feet arranged with two toes forward and two backward. Instead they have the ordinary perching type of foot with three toes forward and one backward. Both the toes and claws, however, are, of necessity, much better developed than in ordinary perching birds. Certainly they seem to have no difficulty in spiraling about the trunks of trees and, in fact, they have been known to sleep hanging head downward, clinging to



WILL IT DO?

A prospective tenant inspecting a nesting box. He seems to be somewhat in doubt.



HIDDEN TREASURES

Inside the knot-hole are seven young nuthatches, jealously guarded by the mother.

amining the crevices of the bark. The loud whistled call of the tufted titmouse, *peto-peto-peto*, is one of the familiar sounds of the southern woodlands, while the *tu-whit, tu-whit, tu-whit*, of the plain titmouse is always associated with the live oaks of California.

The wren-tits and the bush-tits are browner birds than the chickadees, the wren-tit being more or less wrenlike in its brown garb and its habit of holding its tail tilted upwards. The bush-tits are mere sprites of bird life, over half of their length of four inches being tail, so that their bodies seem scarcely larger than the end of one's thumb. In habits they resemble the chickadees with the exception that they build long purse-like nests of soft materials, hanging them usually in thickets of ash and willow.

The verdin is quite similar to the bush-tit in size and habits, but its whole head, neck and chest are bright yellow. It lives in the mesquite valleys of the Rio Grande, the Colorado, the Gila and the Pecos Rivers of the Southwest where, from the thorny bushes, it scolds and sputters at every intruder.



HE LIKES SUET

Some good friend has remembered that this is the favorite dish of the red-breasted nuthatch

the bark beneath a jutting limb. They are lively little creatures, always on the move, peering at one from strange angles, and their contented *yank-yank* adds much to the cheerfulness of the northern winter. The name nuthatch is supposed to be a corruption of *nut-hack*, derived from their universal habit of wedging the bark and then hacking them open. The white-breasted



A CAREWORN NUTHATCH

There are nine young hopefuls inside this hollow stump, and they demand so much attention that they allow her little rest.

nuthatch is the commonest species and is found throughout United States and Canada from the Gulf States to Central Ontario, preferring open woodlands, roadsides and gardens. It is pure white beneath, except for the under tail coverts which are reddish brown, and bluish-gray above, the top of the head and neck being shining black. In the female the black is more or less veiled with gray.



A PERKY MEMBER OF A FAMILY OF NINE

There is no danger of race suicide among chickadees, for large families are the rule, and this one looks fully able to paddle his own canoe.

The red-breasted nuthatch nests only in the northern part of its range from northern United States to Alaska, but, in winter, it wanders as far south as the Gulf States. It is somewhat smaller than the white-breasted species, having the entire underparts, except the throat, rusty, and having a white stripe over the eye. It has a partiality for pine trees but, like its white-breasted cousin, it comes freely to the window for suet and sun-



PLANT SUNFLOWERS IF YOU WOULD ATTRACT THE FRIENDLY CHICKADEE

The chickadee is very fond of the seed and the flowers may be left standing or the seed removed for use at the window feeding shelf.



AN UPSIDE DOWN NUTHATCH

Nuthatches travel upward and downward with equal facility and never use the tack as a brace, as do the woodpeckers.



CHICKADEES ALWAYS SHOW THEIR APPRECIATION

"Give us a hand for friendship's sake"—and feed the birds this winter. You'll be well repaid for your trouble.

flower seed. Its notes are very similar but higher pitched and more nasal like the syllables, *yna-yna*.

The brown-headed nuthatch is confined to the southeastern United States from Delaware and Missouri to Florida, frequenting the extensive pine forests. It is smaller even than the red-breasted species, and its notes are different from either of the preceding, a conversational *pit-pit* and a scolding *dee-dee-dee*, being the most familiar.

Similar in appearance and habits but still smaller, measuring sometimes less than four inches in length, is the pigmy nuthatch of the Rocky Mountains.

The nesting habits of the North American nuthatches are much alike. They usually select a knot hole in the trunk of a tree, occasionally a woodpecker's hole, and line it with feathers, leaves, wool, etc. They lay from four to nine white eggs, which, differing from the majority of hole-nesting species, are heavily marked with brown. The common European nuthatch has the curious habit of plastering up the entrance to its nest with mud until the opening is just the right size, and the American red-breasted nuthatch usually decorates the entrance with nodules of pitch as if to make the entrance less attractive to squirrels and other enemies.

A TRAIL MARKER

BY LENA B. HUNZICKER

AT Old Town, San Diego, California, at the foot of Presidio Hill, stands a venerable palm tree, the Plymouth Rock of the Pacific Coast, the oldest living object to tell the story of the coming of the Spanish to Upper California in 1769.

The seed from which this remarkable old tree grew was brought with the provisions and supplies of the Spanish expedition and is said to have been planted by Padre Junipero Serra in 1769. Until some five years ago two palms of this first planting were still growing.

It is said that the only time the trees bore fruit was



THE "PLYMOUTH ROCK" OF THE PACIFIC COAST

The palm at Old Town, San Diego, California, a landmark and still beautiful, said to have been planted by Padre Junipero Serra in 1769.

in 1869, one hundred years after their planting. Fronting a public highway they became much scarred, until in 1887 they were enclosed in a fence to protect them from further injury. A severe windstorm some five years ago so badly damaged the smaller one that it had to be cut down. A portion of the old trunk has been placed in the museum at Ramon's Marriage Place, at Old Town. The other tree has been braced and bids fair to live many more years.

HARRY C. HYATT, city forester for Cleveland, Ohio, warns the people of Cleveland that constant vigilance is necessary for successful tree culture in a congested city. His department has the care of more than 125,000 street trees and the trees in over 2500 acres of parks.

A QUAIN BIT OF SENTIMENT

BY GAYNE T. K. NORTON

UP in the woods near Tuckahoe, N. Y., are two saplings, growing side by side, tall and straight. About eight feet from the ground they are joined, and in that joining lurks a bit of mythology and sentiment, for it is a true lover's knot, unknown and unnoticed by many who tread the path below.

It was the custom in old Arcady for a man and a maid upon their betrothal to go alone into the woods. There, two very young saplings, growing side by side with branches intermingled, were selected and in some way fastened together, by grafting, tying or splicing, so as the years passed, they would become as one. If the trees grew tall and straight above the knot all would be well in the lives of the couple; but woe to the unhappy pair did they grow apart. Great care was used in the selection, to see that no other tree would interfere with growth, and saplings sheltered from storms were sought for; and, once chosen, the young trees were carefully tended and watched. So the legend ran.

We, my companion and I who had found and photographed the knot, walked on, aglow with imagining the story it held, noticing not at all the chill of the January afternoon. A bit further on was a lad of eight, in sweater and rubber boots, brown and healthy, "discovering" his whistle.

Making ourselves heard we asked where a spring might be found. He led us to his home, showing the way to two chairs before a crackling log fire in a cozy New England kitchen. Behind us bustled a fat and smiling, middle-aged, motherly person, who, paying no heed to our protestations, set before us two steaming mugs of coffee, with sugar and cream—not the doctored, delicatessen kind, either—and a heaping plate of doughnuts, the specie with the hole in the middle. She talked while we ate; and what a treat it was! Then her husband came in, a big, strapping fellow in boots and furs, who bayed a welcome that made the tea-kettle cover vibrate. The motherly person brought him slippers and pipe, seated herself and knit-

ting at his side (she was doing socks for Canadian "boys" at the front) while "Tow Head," as he called our young guide, climbed to his lap. For minutes we listened to the fire, perfectly happy as the pipe smoke curled and the doughnuts settled. Then our host startled us.

"I expect you chaps are wondering about 'the knot?'" A contagious chuckle rumbled out as he noted the surprise. "I'm a bit of a woodsman," he explained, "and I saw you without bein' seen."

"May we have the story?" my companion asked.

The big fellow settled comfortably. His wife smiled happily, edging closer. "Tow Head" yawned.

"'Tain't much of a story," he began, "but here it is. You see my Granddad and Dad both lived long and happily up in Canada. They were both married over the 'knots' they'd tied, and swore by them. 'Twas only natural I should believe in the custom, too. So when I came down here—South, we call it—I brought it with me and when we became engaged," here he simply took the ready hand of his wife, "why we 'tied a knot.' That's longer ago than my wife cares to remember, so we'll forget the date. The end of the tale you see. The trees grew straight, that's all."

To give his name would be a sacrilege, but the knot-bound trees are there, by a path in the Tuckahoe woods, and the New England kitchen is not far distant.



A "TRUE LOVER'S KNOT" NEAR TUCKAHOE, NEW YORK

By an old custom a newly betrothed couple spliced two growing saplings together so they would become one. Such splicing caused the growth shown in this picture.

IN BUILDING the government fleet of standardized wooden ships one item is the use of creosote to prevent decay of exposed surfaces. The instructions to district officers of the Emergency Fleet Corporation provide that during the building of the hulls of these ships the joined surfaces of timbers and planking shall be treated with a coal tar distillate of the physical and mechanical characteristics required by the specifications for the brush treatment of poles adopted by the National Electric Light Association.

FLOWERS, FEATHERS AND FINS

BY R. W. SHUFELDT, M. D., C.M.Z.S.

SOME of the handsomest and most showy flowers we have in our flora are not those that blossom on plants in the meadows, fields and marshes, but are to be seen, as spring opens, on some of the grandest trees of the forests. A conspicuous example of this is to be noted in the tulip tree.

Few there are among us who give any thought to the ancestry of trees, that is, to the evolution of trees in time—geologic time. For example, it is now known that our present-day tulip-tree is, as a species, the last of an extinct type which, ages upon ages ago, was extremely abundant. There are some seventeen species of tulip-trees, all extinct, in the Cretaceous formation alone. They have been discovered in Kansas, New Jersey, Wyoming and Nebraska, while other fossils of them have come from Greenland and Bohemia. Still other types have been discovered, mostly in Europe,

in the Tertiary formation. The flowers of the tulip-tree are well known, as they are large and very showy.

Throughout the Middle Atlantic States we have, in suitable localities, some shrubs and plants that do not flower until far into the autumn months. Some of these have already been figured and described in AMERICAN FORESTRY, while others were set aside to have attention drawn to them here. Among the shrubs there is the well-known and favorite sassafras and its beautiful berries, or what might better be designated as its fruit. It has been described as *Sassafras verifolium*, likewise as *S. officinale*, and it is the only species known to the botanist, occurring, as it does, principally east of the Mississippi and southward; it is also found in southern

Canada. As all know, its bark and roots are aromatic; and not only are its leaves green, but also its bud-scales, flowers and its small branches and twigs. One of the most curious things about this sassafras tree is, however, the form of its leaves; they are dimorphous—that is, the earlier ones are oval in outline and entire, while those coming out later are irregular in outline and three-lobed. In Australia there are other shrubs called sassafras, but they do not belong in the same group as our United States form. Still other shrubs bear the same name in South America, and some of these are magnolias.

Passing to the more humble plants of the fall months, there is a very interesting one in the Turtle-head, also known as the Shell-flower and Cone-head in some localities. It is found growing along streams and on the

edges of big swamps and marshes. Sometimes you will run across a fine plant of this species, doing beautifully among the rank vegetation springing up in an old ditch containing clear water. It occurs almost anywhere east of the Mississippi, flowering from July to September, according to locality. The plant is rarely seen north of Newfoundland, and it is not especially abundant anywhere. Regarded upon side view, one of the flowers rather reminds one of the head of a small turtle with its mouth open. Big bees, in serving it,



THIS OLD TULIP TREE COULD TELL AN INTERESTING STORY

Fig. 1—Under certain favorable conditions, the Yellow Poplar or Tulip-tree (*Liriodendron tulipifera*) may come to be of a great age, attaining a height of an hundred feet or more. The one here shown is considerably higher than that, and it may be a century old. It is on a hill south of the National Zoological Park, Washington, D. C., and it is now on the decline.



A GLANCE AT THESE FLOWERS WILL EXPLAIN WHY THIS PLANT IS CALLED TURTLE HEAD

Fig. 2—There are three species of this Turtle Head (*Chelone glabra*), also called Snake Head and Balmony, and all, with the exception of *C. lyoni* of the South, are prone to grow in wet and damp places. The flowers of this Turtle Head are white, tinged with rosy pink; while in *Lyoni's* Turtle Head the corolla is of a rich purple, with a decidedly rosy hue

have a hard time squeezing in past the pseudo lips of the matured blossom. Once inside, however, the insect's movements are communicated to the whole flower, while the former is entirely out of view. The "head" and "jaws" now seem to simulate those of a masticating turtle—in fact, an eyeless, white-headed turtle, tinged with



FEW TREES BEAR HANDSOMER FRUIT THAN THE COMMON SASSAFRAS (*Sassafras variifolium*).

Fig. 3.—This tree has been placed in the Laurel family (*Lauraceae*). The ovoid drupe or fruit of the Sassafras is at first a bright green or yellowish green; it then turns a deep bluish or purplish black, and has the form which is so well shown in the cut. The pedicels are of a reddish flesh color, cupped at their extremities. The early French settlers in Florida gave this tree its name, and it is generally found growing on the limits of rich woods.



IRONWEED IS ONE OF THE GLORIES OF THE FLOWER WORLD IN AUTUMN

Fig. 5.—This plant is also known as Flat Top (*Vernonia noveboracensis*), and it is a member of the *Compositae*. Its flowers are of a rich purple, and some thirty or forty of them make up a head. Sometimes it grows to be six feet high, and is then very conspicuous in the old fields and damp places

pale pink, deliberately chewing and chewing a bumble-bee. The resemblance, which may last for an entire minute, is quite ludicrous.

The one who gave the vernacular name of "Elephant's foot" to the plant of that name must have been endowed with an unusually keen imagination—in fact, with a far-fetched faculty of seeing resemblances in forms as utterly unlike in every particular as those of a tea kettle and a crooked pin

Elephant's foot is easily recognized either by its flowers or by the triangle of leaves or bracts that encircle them at their bases. Each head of this plant is composed of a cluster of several flowers. It blooms rather late in the season, and is generally found in dry places in the open woods—sometimes in great masses extending over from ten to twenty square feet. The thin, ovate-oblong leaves are somewhat hairy, and the plant is a perennial—that is, it appears year after year in the same localities.

When the autumn days come around, the flower world is represented by some very distinctive and conspicuous plants in the entire northeastern section of the United States. Some

of these bear a certain resemblance to each other—at least some people seem to think so—such as the Iron-weed, the Joe-Pye weed, and the larger species of the purple asters. At the same time of the year, and pretty much in the same places—that is, in old fields and along country roadsides—are also seen in all their glory, several species of thistles; the milkweeds all in pods; the boneset, black-eyed Susan, and everywhere the coming goldenrods of several kinds. Of all these none is richer in color, or more conspicuous in size and massing than the elegant Iron-weed or Flat-top. Many species of big butterflies are now in evidence, and the well-known tiger swallowtail seems to be partial in its attentions to the flowers of this well-known plant. The one shown in the illustration, however, is a Viceroy butterfly, seen on side view (*Basiliarchia archippus*); it does not show up very well for the reason that it lit within the shadows of the flowers and upper leaves of the plants. The former are tubular and the latter are alternate, nearly lanceolate, and have finely serrated margins, being withal very rough on both surfaces. *Vernonia* has its name from William Vernon, an English botanist of long ago, who, at one time, botanized in this country.

Passing to the thistles, this is a numerous and a sometimes puzzling group of plants, though not quite as much so as the goldenrods or the asters. Our common burdock is more or less nearly related to any typical thistle; and the bur of a burdock, when the purplish flower-head appears, quite closely resembles the corresponding parts in a thistle. The thistle shown in Figure 6 is one of our most abundant species; it is widely known as the Common or Bull Thistle. Its flowers are reddish purple, passing almost to a pink shade in some plants. In still other thistles they may be white, or even of a yellow tint. As in the case of so many other undesirable plants, the majority of our thistles found their way over from Europe.

"When the Danes invaded Scotland," says Neltje Blanchan, "they stole



THIS IS ELEPHANT'S FOOT (*Elephantopus*), AN INTERESTING PLANT THAT BELONGS IN THE GREAT COMPOSITE FAMILY (*Compositae*)

Fig. 4.—Three species of Elephant's Foot have been described, the one here shown being *E. carolinianus*,—a plant growing in dry soil from Pennsylvania to the Lakes and southward. The flowers, well shown here, are of a purplish color.

a silent march upon the Scottish camp by marching barefoot; but a Dane inadvertently stepped on a thistle and his sudden, sharp cry, arousing the sleeping Scots, saved them and their country; hence the Scotch emblem."

Thistle flowers are most attractive to some species of big bumblebees; but they pay well for their over-indulgence in their sweets. The latter are very abundant and unusually fragrant, so that these flowers are great honey producers of the finest quality. This induces the bumblebees to partake unduly of the generous supply so readily secured at each visit, and a species of intoxication is speedily produced in them, greatly interfering with their locomotory powers, as well as with their power to fly.

The largest thistle we have in our flora is probably the Pasture or Bull Thistle (*Cirsium pumilum*), while among the smaller stands the Canada Thistle (*C. arvense*). Then, as stated before, many others belong to several genera, including the Milk Thistle, the Star Thistles, the Cotton or Scotch Thistle, and the rare Blessed Thistle (*Cnicus benedictus*).

Almost without exception, all these plants have been introduced into this country from Europe. The study of the seeds of thistles and the fertilization of the flowers is an extremely interesting story; but it is too long to touch upon in the present connection.

In old fields and along the roadsides throughout the autumn months, when we find the various plants enumerated in the foregoing paragraphs, we will be sure to meet with the widely known garden spider. It also constructs its interesting web in our gardens, and sometimes among the shrubbery of the big city parks, as in Central Park in New York City, and in similar localities throughout eastern United States. When a field covers many acres and becomes overgrown with rank vegetation of many kinds, you will sometimes find this beautiful spider in hundreds, their webs being built as shown in Figure 7. Some of the old ones are much larger than the one here shown—so large, indeed, that their webs will hold a cicada,



A SPIDER THAT WEAVES A MAT TO REST UPON IN IDLE MOMENTS

Fig. 7—This is the common Garden Spider (*Argiope*) so familiar to everyone living in the country where it occurs. Moreover, it is also to be found in city gardens, which was the case with the one here shown in the cut. Note the curious zigzag web it has woven down from its central resting place.

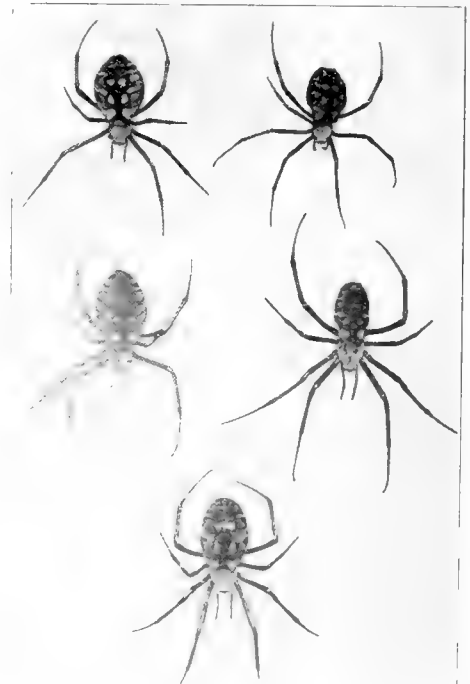
or the humming insect which most people call a locust. We will also find katydids and big grasshoppers in the strong, silken strands forming the web of this famous black and yellow arachnid; for spiders belong to the *Arachnedia* and are not insects at all. If the spider's captive has been recently caught, it may be in its death struggle, with its cold-blooded captor deliberately finishing his victim and applying the first layer of silken wrappings to his body and wings; while, if dead and partly used up, the silken envelope will be very complete and dense, fitting the entire body and wings and limbs of the unfortunate insect with the greatest accuracy and snugness. It is a terrible death, when one comes to think of it, for all such insects can both realize and appreciate the hopeless predicament they are in; moreover, they do suffer real pain.

There is some difference in size of the male and female garden spiders, and they also vary in this particular according to age. Sometimes you will



THIS PARTICULAR THISTLE IS CALLED LANCEOLATUM FROM THE SHAPE OF ITS LEAVES

Fig. 6—There are about a dozen different species of thistles in our flora, and no one of them is better known or more heartily detested by the farmer than the one here shown. Gray calls it the Common or Bull Thistle (*Cirsium lanceolatum*). Its purple flowers are very conspicuous in the fields and along the roadsides, from midsummer until late in the autumn.



VARIATIONS IN THE FORM OF COMMON GARDEN SPIDER

Fig. 8—These five specimens were collected near Great Falls, Maryland, in an old, deserted field having an area of some fifteen acres. It was in mid-autumn, and many plants and grasses flourished there—chiefly Milkweeds, Pokeberry, Boneset, both blue and white; Black-eyed Susans, Joe-Pye Weed, and a great many others.

come across a bouncing, big male—larger than any of those shown in Figure 8. When on their webs, this species always rests with its head toward the ground. It will be noted that the yellow or pale orange markings on different individuals vary a little, while being, invariably, after the same general pattern. You may collect thousands of garden spiders; and, in so far as color-pattern goes, you will not meet with any greater variation than is here shown in Figure 8. Ernest Ingersoll, in his work "The Animal World," says that this species of spider has a "white cross upon its back." In this he is surely incorrect, and must have had at hand some other species when he wrote his account of "The Garden Spider." He does not even refer to the chief



HERE WE HAVE A RELATIVE OF THE COMMON GARDEN SPIDER

Fig. 9—Mr. Nathan Banks examined the specimens shown in this cut, and he said of them that "These spiders are the *Argiope trifasciata*, Forsk., both females. They are commonly called the 'Silver ladder spider.' The species is fairly common in the Eastern States from Massachusetts south to Florida, and into the West Indies and Central America." To this we may add that they were collected at Bradley Hills, near Washington, D. C., being found on a head of a common Golden Rod.

distinguishing character of the garden spider's web—the peculiar zig-zag, dense sort of pathway it spins above and below its central mat or resting place (Fig. 7). The true use of this has not as yet been made out; it appears to be simply added to the web, in many instances, for the purpose of adornment. A close relative of the garden spider is shown in Figure 7; probably both species built a nest quite like the one shown in Figure 10.

Spiders form an enormous group in the animal world, and many thousands of species have been described; doubtless a legion of them are still to be discovered by naturalists. How many have become utterly extinct in geologic time we can never know—probably many times the number, with respect to species, now represented in the world's existing arachnine fauna. Men have lived who have devoted their entire lives to the study of spiders, their researches occupying many hours every day of the week. In a few instances of this kind, only a few genera have thus been studied and worked up. In these war times such devotion is extremely rare.

It is a long span from spiders to owls, and in making it we pass over a great many thousands of animal forms—vertebrate as well as invertebrate. One would be surprised when told of the number of species and subspecies of owls we have in the avifauna of the United States; perhaps not one person in a good many thousand, as people go, would guess anywhere near the correct number. When the American Ornithologists' Union published its

"Abridged Check-List of North American Birds" in 1910, no fewer than forty-four different kinds of these birds occurred in North America, north of the Mexican boundary. Some of the species are very large and handsome, while some of the little pygmy owls are no bigger than a sparrow—beautifully plumaged and having very interesting life histories. Our Saw-whet owls are considerably larger than these, but none the less worthy of admiration and study. In Figure 11 of the present article we have a reproduction of a life photograph of the Saw-whet of the East. Early in the last century this species was quite abundant throughout the Middle and New England States, while at the present writing the bird is comparatively rare. This little fellow is quite nocturnal in its habits; in fact, so poor is its eyesight in the daytime that there are many instances on record where it has been caught by the hand when found perching somewhere in the bright sunlight. The darker part of the plumage is of a rather deep ashy brown, and the lighter part a creamy white, tinged with ash, some of the head and

tail markings being almost pure white. As is the case with nearly all owls, the female is fully an inch larger than the male, and measures about eight and a half inches in extreme length. All owls lay pure white eggs, noted for their unusual approach to sphericity; sometimes an owl's egg will be met with which is almost a perfect sphere. They are extremely useful birds with respect to man's interests, for they destroy on farms and in agricultural districts generally thousands upon thousands of field mice and field mice stand among the greatest grain consumers that the farmer has to deal with throughout



GARDEN SPIDERS BUILD A ROUND AND DENSELY WOVEN NEST

Fig. 10—You will find these nests in the old fields and elsewhere in the autumn. Generally they are attached to the stems of the coarse grasses and other vegetation. A small opening is left at the top, while they are held in place by silken strands leading to the supports on all sides. The butterfly on the ground is a beautiful specimen of a male Buckeye (*Junonia coenia*), an abundant species in certain localities throughout the Southern States. They are very pugna-

cious and fight other species of butterflies. the year. Some of our large species of owls may from time to time destroy poultry on the farm; but they are also the eternal enemies of many of the farm vermin and pests, while the smaller species of these valuable birds stand among the best friends the husbandman has upon his estates. They

should be protected in every way—even introduced, and encouraged to breed upon every grain farm in the country.

In studying various animals and living things in nature, one is often confronted with what has been aptly described by naturalists as cases of "protective resemblance." Some interesting instances of this are met with among owls, as for example in the "gray phase" of our common screech owl, which, when perched upon a mossy, dead limb of no great size, with its body drawn up in an elongated fashion, and with its feather-horns fully erect, closely resembles a dead and broken branch, and many a screech owl has owed its life to this remarkable resemblance. To study some of the most extraordinary examples of this protective resemblance, however, we should turn to the insect world. Cases are to be met with among insects in every quarter of the globe, and a very noteworthy one is to be seen in our common stick insect of the Eastern States. In Figure 12 one of these is shown reproduced from a photograph from life. It is extremely difficult to recognize one of these fellows among the small green twigs of the tree or plant upon which it may be resting, especially if it extends its fore-pair of limbs to the front,

bringing them close together, as it often does. Its resemblance then to a small, green and leafless twig is almost perfect, and its enemies—or would-be tormentors and destroyers—almost invariably pass it by unnoticed.

In some of the books these insects are called "walking-sticks" from the deliberation of their movements and locomotion (*Phasmidae*). Belle Cragin says of them: "The insects have so strong a resemblance to brown and green twigs and stems that it takes a sharp eye to detect them when they are at rest. The body, legs, and antennae are long and slender. Our one common species has no wings, but the tropical species have wings that look precisely like leaves. They walk slowly and awkwardly. The middle pair of legs is the shortest. They feed on the leaves of trees and plants."



THIS IS ONE OF THE MOST INTERESTING OF ALL THE SMALLER OWLS IN OUR AVIFAUNA.

Fig. 11—In the southwestern parts of the United States there are found various species of elf and pygmy owls that are little bits of fellows. The one here shown is considerably larger, and is an eastern species. It is called the Saw-whet, as its call sounds like the noise made when sharpening a saw.

This protective resemblance occurs throughout nature but more especially in the animal world. It must not be confounded with "protective mimicry," which is quite a different thing. Then, some forms are capable of more or less suddenly changing the color of their skin, and by so doing



AMONG INSECTS THE WALKING STICKS PRESENT THE MOST REMARKABLE EXAMPLES OF PROTECTIVE RESEMBLANCE.

Fig. 12—The life history of our "stick insects" is wonderfully interesting, and there is considerable literature on the subject. Dr. L. O. Howard tells us that "in 1898 this insect appeared in extraordinary numbers in a black-walnut forest in western New York, so that in the autumn the dropping of the eggs on the leaf-covered earth sounded like a heavy shower of rain." The specimen here shown is of a bright green color.

match, to a greater or less extent, their surroundings, which at once render them far less easy to be seen by an enemy or other observer. A good example of this is to be noted in our common American chameleon of the Southern States (*Anolis principalis*). It possesses the power of assuming a variety of colors, ranging all the way from a deep snuff-brown to a pale pea-green—the desired change being accomplished with more or less celerity. This lizard often attains a length of seven or eight inches; and along the bayous in

lower Louisiana, it is interesting to observe a big one cautiously creep down the dark trunk of a cypress tree, which latter has some of its roots extending into the waters of the bayou. Should one make a pass at this lizard with the intention of capturing it, and miss it, the fellow will dart down the trunk spirally as quick as a flash, and, quitting the tree, leap onto one of the stems of the pickerel weeds growing in the water. Then, cautiously creeping up on the further side of this, it rapidly changes, as it does so, to a shade of green which more or less closely matches that of the stem of the plant. The fact that the fellow quickly comes to a dead rest still further enhances its safety; for, being of a decidedly elongate form, from the tip of his nose to the end of his tail, he simulates the green, rod-like stem of the pickerel weed upon which he rests.

Remarkable examples of protective mimicry are likewise to be seen among fishes, and no form presents a better exemplification of this than the peculiar little seahorse of the Australian seas (*Phyllopteryx*). Its body and fins, in color and otherwise, have come to be so modified that it, as a whole, looks like a crooked bit of stem of oceanic seaweed, with the delicate, slender and wavy branchlets floating from it. As it lives among the very

vegetal growths of the ocean which it closely resembles, the chances of being observed in its natural habitat are quite remote under any conditions, and it thus frequently escapes its enemies, should it have any that prey upon it. Most fishes, however, offer no such remarkable peculiarities; they are just plain fishes, like the common

American Yellow Perch. This is a very handsome inhabitant of fresh-water ponds, lakes and streams, being extremely abundant in some sections. It is considered to be entirely typical of the true bony fishes in all particulars, with respect to its structure, and its skeleton has long been used as the type for the osseous fishes.

WOMEN HELP TO FIGHT FOREST FIRES

THREE Arizona women have received the official thanks of the Forest Service, in the form of a letter from the Acting Forester, for



MISS LILLIAN ERICKSON

services rendered in fighting forest fires. They are Mrs. O. P. Schoenberg, of Portal, Arizona, and the Misses Lillian and Hildegard Erickson, of Cochise, Arizona, who last June and July assisted forest rangers in suppressing serious fires which burned over about 24,000 acres in the Chiricahua division of the Coronado National Forest, in Arizona.

At a time when all the available

men were needed on the fire line, officials of the Forest Service say that Mrs. Schoenberg, who is the wife of Forest Ranger O. P. Schoenberg, took over the work of securing labor, handling the telephone exchange, and thus keeping



MRS. O. P. SCHOENBERG

the various crews in touch with each other, and running the commissary for the large force of laborers employed on the fire. She also arranged for the disposition of the men at the different fire-fighting crews and fed the newcomers on their way to the fire. It is stated

that her excellent judgment and initiative were of material assistance in extinguishing the fire.

The Misses Erickson, daughters of a Forest Ranger, took an active part in the fire fighting. They organized and set to work one crew of men and aided in securing others. On one occasion, by actually fighting fire all night, they



MISS HILDEGARDE ERICKSON

relieved a crew which was urgently needed at another fire. In addition they carried food and water to the men on the fire line, who otherwise would not have had anything to eat.

ELOQUENT testimony as to the value of proper care for trees in city parks is afforded by the statement of Park Commissioner Cunliff, of St. Louis, as to the decrease in tree mortality in Forest Park, in that city. Forest Park contains approximately 50,000 trees. The number of trees dying during the last twelve months was only 453. During a similar period four years ago the number of deaths was 1200. Last year it was 600. The lower death rate of the trees is attributed to improved methods of care and repairs applied during recent years. The trees removed will this fall be replaced by planting 10,000 saplings.

JOHAN GORDON DORRANCE, first assistant forester of the Maryland State Board of Forestry, has entered the Engineer Officers' Reserve Corps of the United States Army, with a commission as second lieutenant. He is the first man to represent the forest engineers and professional foresters of Maryland in the forest regiments organized by the War Department. As a part of his training Mr. Dorrance studied in the Black Forest of Germany and at the University of Hesse-Darmstadt and Heidelberg. He holds the degrees of bachelor of forestry and forest engineer from Biltmore College of Forestry.

CONSERVATION IN AUTUMN LEAVES

IN the autumn tints of the woods there is no evidence that nature is practicing conservation in her use of coloring matter. The lavishness with which she has painted the landscape red, yellow and brown suggests to the layman that she is altogether reckless in her desire to make the country attractive and that she has a fine disregard for the war-time supply of pigments.

To the dendrologist the rich coloring tells a story of true conservation, and gives additional proof that nature never wastes her resources. The brilliant hues of the forests are a manifestation of a plan to use everything to the best possible advantage. The change in coloring which takes place in the leaves during the autumn is the result of chemical processes which are at work in nature's laboratory. It is a part of nature's preparation for winter. Science explains that during the spring and summer the leaves have served as factories for the making of the foods necessary for the growth of the trees. This process of manufacture takes place in numberless tiny cells of each leaf and is carried on by small green bodies which give the leaf its color. These are known as chlorophyll bodies. By taking carbon from the carbonic acid gas of the air and combining it with hydrogen, oxygen and various minerals supplied by the water gathered by the roots these bodies make the necessary food.

In the fall, when cool weather causes a slowing down of the vital processes the manufacturing ceases and the chlorophyll is broken up into the various substances of which it is composed and the food is sent to the body of the tree to be stored up for use in the spring. All that remains in the cell cavities of the leaf is a watery substance containing a few oil globules and crystals and a

small number of yellow, strongly refractive bodies which give the leaves the yellow coloring so familiar during the months of the autumn. For the reds and browns sugar is responsible. When there is more sugar in the leaf than can readily be transferred back to the tree its chemical combination with the other substances produces various tints, ranging from the dogwood's red to the red-dish brown of the oak.

The feeding of the tree itself is only a part of the duty of nature's chemical laboratory. The entire vegetable kingdom depends to a large extent on the food supply created by the leaves. Chlorophyll green is the only substance which has the power to break up rocks and convert them into starches and sugars. As the tree drinks in water from the soil the flow carries small particles of rock into the trunk of the tree. When the chlorophyll is returned to the parent stem by the leaves it works on these particles and through chemical reaction converts them into sugars and starches for sustaining the life of the tree. Nature's fine adjustment of things is evidenced in the circumstance that the chlorophyll all disappears from the leaf before the leaf falls and thus protects the surface rocks from any danger of disintegration such as might occur if the leaves which are deposited on them carried this chemical substance.

With the return to the tree of the food substances the leaves retain relatively large amounts of nitrogen and phosphorus which were originally a part of the soil. Through decomposition the fallen leaves enrich the soil and it is because of this and the accumulation of humus that the black earth of the forest floor is so fertile. For this reason the burning of leaves on the forest floor robs the soil of much of its fertility.



A BEAUTIFUL "MONKEY-POD" IN HONOLULU.

By an official order given by ex-Governor Sanford B. Dole, this tree was left standing in its original place when the street was improved.

TREE SAVED BY A GOVERNOR

BY ALLEN H. WRIGHT

WHEREVER one may go, he will always find something of interest in connection with the trees which may grow there.

In the city of Honolulu, Hawaiian Islands, for instance, one will see in Vineyard street a beautiful specimen of the monkey-pod tree, standing squarely in the center of the thoroughfare, its great branches extending far over the property-line on either side of the street.

The interesting story about this tree is that former Governor Sanford B. Dole, who was at one time the president of the short-lived republic which followed the end of the rule by native kings and queens, gave an official order that this tree should be left standing when the street was improved, and so it stands today unharmed, beautiful in its natural spread of branch and shade, acting as a guide for autoist or driver to keep to the right side of the highway.

URBAN AND SUBURBAN FOOD PRODUCTION--ITS PAST AND ITS FUTURE

BY CHARLES LATHROP PACK

President of the National Emergency Food Garden Commission and President of the American Forestry Association.

THIS is the time for stock taking in connection with the food situation. We have had a growing season which broke all records and was generally beyond expectations. The work of gardening, of canning and of drying vegetables and fruits has been under way in the land, from Maine to California, and from the Lakes to the Gulf, and has justified all belief as to success. It is important to consider what this means. It means one million one hundred and fifty thousand acres of city and town land under cultivation the past season for the first time. Urban and suburban America became a vast garden as the result of the impulse given to the nation by the National Emergency Food Garden Commission. This area of productiveness embraced back yards, vacant lots and hitherto untilled tracts of land in and around nearly every city, town and village. Our nation-wide survey located nearly three million such gardens. This is only a beginning. What shall the harvest be next year? What have we learned this year?

Germany reports that its town war gardens produced more in 1917 than any year since the war started. This shows the value of experience. In our one year of experience, it is conservative to state, that by the planting of gardens the nation's food supply has been increased to the extent of more than \$350,000,000. Next year we will do even better. We will then have more war gardens and the average production will be larger. With a better knowledge there will be fewer failures.

Any inventory of the food situation must reckon this great garden fruitfulness as a vital factor. As its first duty, already accomplished, it has been of great value in keeping down the cost of living for the people of America. Household expenses have been bad enough as it is. That they would have been far worse without this garden crop is obvious. There is much evidence that our food gardens are helping our people to feed themselves more reasonably. The editor of the North American Review, in the issue for September, 1917, says: "Last spring at garden planting time we urged the increase of production, partly through intensified culture, to increase the yield per acre, and partly through the increase of acreage by the cultivation of neglected fields and even small plots in suburban and urban areas. How well this policy was executed is seen in the report of the National Emergency Food Garden Commission that the gardens of the country were this year more than trebled in area. Beyond question, this garden achievement has much to do with the fact that the increase in price of garden products in the year was only 22 per cent, or less than one-fifth the increase in the price of breadstuffs."

The war gardens of America have been extensively referred to as a valuable economic agency by the news

papers of England, France, Italy and South America. The significance of this planting does not end with the summer season. The war gardens will exert their influence on the cost of living during the winter months. Their value is a thing of the future as well as the past. Conservation has been practiced on a national scale. In the homes of America there has been earnest recognition of the importance of looking ahead. The individual citizen has realized that the over-supply of the growing season must be translated into terms of abundance for the winter. This realization has brought about such activity in household conservation as America has never before known. Food saving and food conserving are becoming national characteristics. From a wasteful nation America is being transformed into a nation alert to the needs of the future. The keynote of this new national spirit has been that nothing should be allowed to go to waste—that nothing useful should be thrown away.

The result will mean much for food F. O. B. the pantry shelves in the homes of America this winter and help us, by feeding ourselves, to feed our boys of the Army and Navy and to feed our Allies. Our soldiers must all be fed and the soldiers and civilians of France and England must be fed, and to a large extent fed by us, and we are going to see that this is done. The gardens of next year will exceed those of the past season. In the canning and drying of vegetables and fruit our women have been contributing their share. The canning and drying movement has brought back to thousands of American households an art almost forgotten since our grandmothers' day. This will be continued next year on an even larger scale.

War has made Uncle Sam the biggest buyer of food in this country. The board bill for his soldiers will soon be at least \$1,000,000 a day. We are to have 2,300,000 or more men under arms shortly according to Secretary Baker. At forty cents a day food cost per man it will be seen what that means. True, these men ate before becoming soldiers to make the world safe for Democracy. Each of them doubtless ate more than forty cents' worth daily. But you must remember that these men have suddenly become non-producers, and they must be fed by the rest of us. The army is making great plans for camouflage to deceive the eyes of the enemy, but you cannot deceive a soldier's stomach. He must have real food.

I am told that the reserve stock of foodstuffs at each camp is worth \$125,000, and there are 33 camps in the country today. This means that food valued at \$4,125,000 is taken out of the regular channels of trade production and consumption. These figures give but a small idea of the need of food conservation on the part of the

individual at this time and the need will be greater next year. The National Emergency Food Garden Commission urges every soldier of the soil to at once promote himself to a Colonel of Conservation and to make plans for gardening and for conserving garden food in 1918 as never before.

The glass jar manufacturers of this country have delivered during the season of 1917 about 119,000,000 glass jars. A survey of the household supply of jars used for canning and preserving in some twenty typical towns throughout the country showed that the housewives of America in 1917 used but one new jar to over three and one-quarter old glass jars which were already on hand. Thus you see that in conservative terms the home women of our country put up nearly five hundred million quart jars of vegetables and fruits, certainly three times what had been accomplished in any season before. Next year, profiting by their experience of this year, they will can, I believe, millions more, and more will be needed.

The Commission is, of course, gratified at the success of its work in behalf of food thrift, and congratulates all who have had a part in this patriotic effort. Great credit is due to the newspapers of the country for their splendid and liberal co-operation in aiding to arouse popular interest in gardening, canning and drying, the interest which is so significant of the American determination to neglect no opportunity to strengthen the nation's war-time position.

Much has been learned this year by town and city people about the cultivation of the soil in the interest of thrift and health, and also about the conservation of its products, so that we may look with faith and courage to still greater results for 1918 when the need will be more urgent. I wish to emphasize the fact that there will be a greater demand for food for exportation next year than there has ever been before, and we must fill the demand.

The necessity for this is well expressed by Lord Rhondda, the British Food Administrator. He has said: "I hope the exportable surplus of American primary foodstuffs will be much larger than the present estimates, as the result of food economies by which the United States and Canadian homes are helping to win the war, just as surely as is the production of munitions. Every American woman is in a position to bring nearer the inevitable atonement for the brutal outrages in Belgium, Armenia and Serbia, the sinking of the Lusitania and other horrors, by her day-by-day economies. There need be no fear that the sacrifices will be wasted over here. Unless the Entente Allies are able to import the supplies necessary for the army and the population, victory may slip from our united grasp."

If 25 per cent of the new war gardeners failed, owing to inexperience, to get a good crop this year, not 10 per cent will fail next year. People who did not plant this year have been so enthused with this nation-wide success of the home gardening and home canning movement that they will not be doing their duty to themselves or

to their country if they do not do their share in 1918. That they will do their duty I am altogether confident.

I want to praise the women of this country because it is the women who in a peculiar sense understand what the war means. It is my experience that the practical women of America have been practicing thrift for many years and that they know full well how to practice economy without parsimony, and that this year in addition they have added to their duties the patriotic work of extra food production and extra food conservation.

This war will be won in large part by fighting with food. We will do our duty in this hour of trial, and we have no greater duty than the production and conservation of food. This war is as much our war as it is the war of Europe, and unless we can keep the soldiers and the women and children of our Allies fed, the western line of defense may be thrown back toward the Atlantic seaboard, and it is well within possibility that in that case we would see the enemy's army on our shores.

To prevent this disaster calls for the best effort of every American household. You cannot starve Germany. Ambassador Gerard has told us so, and from the available evidence I believe he is right; but we will starve our Allies if we are so short-sighted, small and mean and unpatriotic as not to deserve the name of Americans. This must not be! It will not be.

You do not now have to be told again the need of food F. O. B. the kitchen door. This truth has made itself felt in millions of American homes this year. The town or city farmer who can raise even half of his winter supply of vegetables is able, as a result, to accomplish much as a constructive citizen. In other words, we must make a big drive to produce food in this country as near the point of consumption as possible, rout the middleman and the cold-storage man and help the railroads in the tremendous transportation problem that confronts them while the country is at war.

Glass jars and all other containers must be conserved this winter and the manufacturers must next year be prepared to meet the largest demand for them the country has ever seen. From every section of the United States and Canada come reports that the production of vegetables and fruits suitable for canning will next year far exceed the high water mark of this year.

The food problem is one of the vital issues of today. It is a problem from which none of us may escape. Each of us has his individual responsibilities in the situation. To win the final victory in the great war, America must feed not only herself and her fighting forces, but she must help to feed the people of England, France, Italy and Russia. To do this with the highest measure of efficiency is the real problem. There must be no lost motion. Every move must be made to count. Every act must be a blow for liberty in our work for Democracy to save and redeem civilization. It is not enough that we should all be alert to the food needs of America and her Allies: we must back that alertness with constructive skill and real industry.

Forestry for Boys and Girls

by Bristow Adams

"SHOES AND SHIPS AND SEALING WAX"



SAYS Toto, "am going to be a averator."

"It ain't aver-ator," responds his older brother, "it's avee-ator."

"Well, anyhow, whatever it is, I'm going to be it."

"I'm not," returns Everett, "I'm going to

be a soldier and shoot with a gun."

Toto maintains that he is going to fly and is going to shoot also, because, as he points out, the aviators that he knows are soldiers. He knows a good many, because there is an army aviation school near us, and ever since last June there had been class after class of young men, each group getting a start in the work, to finish in real flying at some other place in this country or abroad. Toto is a great favorite with all of them.

Soon Everett comes in and asks for ten cents to buy a wooden gun he has seen. I try to tell him that he can make a better one for himself, at which he turns the tables by saying "I can make one if you will let me use your saw."

He knows that the saw and plane and chisels and other tools, that father keeps locked-up, are not to be used by small, unskilled and careless hands; but he is sharp enough to see that I must yield the use of the saw to carry my point about his making the gun. So, on promise of care and quick, safe return of the saw to its right place he sets out to make the gun. He is good at this sort of task and does a neat job. The gun he makes is far bigger and better than the one he can buy.

Then Toto wants to make an airplane of

some sticks I have been saving to use in holding up plants. He sees that I can not favor his brother and refuse him at the same time, so he gets the sticks, and both boys work together and make the toy plane.

WOOD furnishes them with the stuff they need. Small as they are, and as little used to workmanship, they can make wood serve their purpose. Was there ever such a useful stuff for making all sorts of things? Even the airplanes and the guns of the great war must depend on wood. Here is the whole range of uses, from serving child's play to man's fury. Of course, if the trees had anything to say about it they would be used only for building up, and not for tearing down, and would be man's play things rather than his destroyers. Yet ground wood, finer than sawdust, is a part of much of the gun powder.

Toto has, in common with other boys of today, a whole new field of make-believe. In my day we never took much stock in flying, except as we dreamed of it. Most boys and men, even old men who never had seen a man in the air, have had dreams of flying. It is common in children's sleep, I think, to dream of launching forth from a high place and floating in space, much as a bird sails, and without effort. Very few, I find, have not had this dream,—a dream that comes again and again, of being wafted through the air. And now Toto actually sees it, along with the rest of us, and when he is a grown man it will be common. War has made it come sooner than it would have come otherwise. One cannot help thinking what a boon flying will be in making forest



surveys. Already an airplane has been in use to search out forest fires.

PLAYING at war has been just as much a game for boys as dolls have been for girls. It was always a part of youth to fight battles of one sort or another, real and unreal. This year our boys have helped in real war by fighting weeds in home gardens. Maybe this thought has made weeding easier than I found it. Hoe in hand, to keep down the weed enemies, sounds very well these days. It was hard work as I look back on it, and I find that Everett and Toto will work till they are ready to drop, digging rows of trenches all over the place, but rows of onions to weed are not so good.

Boys are about the same, I guess, no matter what the time or place.

THERE was some fun, as I recall, in going miles over the fields after the mail, carrying a limber switch by way of a sword, and lopping off the heads of wild carrots and daisies that grew along the wayside, exclaiming, "Die, villain!" as the blossom heads dropped. The lumbering grasshoppers, flying up thick, were the bullets of the enemy; if one struck the hero's right arm he would have to transfer his sword to the left and keep up the fight; if he were struck in the leg he would have to hop along as best he could on one, trusting that it would heal before both pins were gone. If a grasshopper bullet struck him over the heart he just had to go to the hospital in a neighboring fence corner and find some slippery elm or blackberry medicine until he was cured of his wound. The folks

at home used to have to wait a long time for the mail on these days of battle; and it must be owned that the hurts received when the hero returned home were more serious than the ones he got in combat. I suppose all this has been changed by the rural free delivery, and the small boys of the present day do not have the perfectly good excuse of going after the mail to get them out of the job of weeding the onions.

BUT that is not what I started to write in the beginning. It was rather to call attention to the great need of wood, and the greater need, while we still have the chance, to see that there shall always be plenty. The wooden sword and the wooden toy gun may go out of fashion. I hope they will, just as I hope this struggle will prove to be the War for Peace. But wood will never be less useful; and when I see it going into so many new things, such as airplanes, I know that man will need it and use it even more in the future than he has in the past.

When the Walrus and the Carpenter, on that well-known walk, spoke of many things, such as "shoes and ships and sealing wax," they did not get very far away from wood. Because shoes must be made on wooden lasts, and many are pegged with wood, the leather is tanned from an extract of tree bark; in Holland boys and girls wear whole wooden shoes. And as for ships, we know they are made from wood, and even the iron ones have wooden masts and spars. When it comes to sealing wax, the hardened gum of the pine tree, known as rosin, we are in the very heart of the use of wood. Let's keep it growing!



CHILDREN'S PLAYGROUNDS IN PARKS AND FORESTS

By SMITH RILEY, District Forester

"The paths, the woods, the heavens, the hills,
Are not a world today,
But just a place God made for us
In which to play."

WHO of us but does not love the mountains with their snow-capped peaks and forests and tumbling streams?

More and more we are coming to realize that the National Parks and Forests of our country are nature's playground, set aside as vacation joylands for little folks and big. John Muir once said:

"The tendency now-a-days to wander in the wilderness is delightful to see. Thousands of tired, nerveshaken, overcivilized people are beginning to find out that going to the mountains is going home; that wilderness is a necessity; and that mountain parks and reservations are useful, not only as fountains of timber and irrigating rivers, but as fountains of life.

"So we wander in search of mountain wild flowers, following the trails that lead to the alpine meadows, listening to the bird songs as we pass, wrapped in the peace of the perfect hills, while all about us the infinite beauty of things created, the magic of the summer skies, the strength of the far-flung bastions, the purity of the eternal snows, and the glory of the flowers that bloom above the clouds, bid us remember

that we are walking in the freedom of the garden wild with God of the open air." There are numberless men

and women who see in the open only discomfort and apprehension. Such people are largely dependent upon the comforts of life, having received no opportunities in the active days of their youth to acquire a taste for the things of Nature and the great outdoors. Big places make big thoughts, and big thoughts make big men and women. Can we not then offer the use of our Parks and Forests as places of education for

the citizens of this nation in which to teach their children the lessons of the wilderness? Mountain, prairie, and walking clubs are developing rapidly throughout the country. These offer outings to those grownups who have developed an appetite for outdoor life, but only occasionally is it possible for parents to have their children accompany them.

There are two noted organizations, the Camp Fire Girls and the Boy Scouts, which take larger children into the out-of-doors. The children who join such clubs have, as a rule, a natural taste for country or mountain life, or have had opportunities to develop



PLENTY OF WORK IN THE AIR IS GOOD FOR THEM

Here we catch a glimpse of the Boy Scouts, in camp on the Pike National Forest in Colorado, at their regular morning exercises, part of the routine of camp life.



A YOUNG EXPONENT OF LIFE IN THE OPEN

Rosy-cheeked and happy, he typifies the value of the opportunity offered by the recreational use of the National Forests



"JUST A PLACE GOD MADE FOR US IN WHICH TO PLAY"

A happy crowd thoroughly enjoying a picnic under the trees in the Pike National Forest in Colorado.

their "back to Nature" instincts. Is it not possible for us, however, to reach the hordes of younger children through these means, so they may learn the lessons of nature? Children receive vivid impressions from the ages of eight to fourteen. Why not, then, attempt to reach these younger children?

There is a present day tendency to develop and maintain camp grounds along through highways; to develop mountain foothill and waterside parks near cities. Throughout the West are many municipal parks and camp grounds where hundreds of people of all ages are given an outing each year. At none of these areas is there any form of development for the purpose of educating small children. Older children receive impressions from those things that influence adults, but the bulk of small children receive their keenest conceptions through play. Lessons that come in play are strongest and most lasting to a child.

Here is a big field for developing children's playgrounds in the open where they may teach the lessons which create a taste for nature. There is a tendency to make the playgrounds in the country very similar to those found on the school grounds or corner lots of a city. For example, the City of Denver has constructed a number of playgrounds throughout her moun-

tain parks, amid the most beautiful natural settings imaginable. These are fitted with swings, teeter boards, merry-go-rounds, and turning bars; the same equipment that is placed upon city playgrounds. A child, unless he be exceptional, may go to such grounds and wear himself out at play, time after time, without receiving the least impression of the beautiful natural surroundings.

Can we not hit upon a plan of building up such playgrounds so that they will create a realization of outdoor life and the surroundings in the minds of children? Suppose in place of the swings, teeter-boards, etc., a miniature camp was constructed; a two-room log house with fire-place, furniture and an enclosure where the children could play at camping. To vary this, some playgrounds should be furnished with shelter cabins and a fire-place out in front, which would give a different phase of camp life. Playing housekeeping and giving parties

is a child's favorite amusement. Why not make use of this to create a taste for outdoor life? Trees, shrubs and plants in the immediate vicinity of these camps should be marked with signs so the children might learn



BOY SCOUTS IN CAMP IN THE PIKE NATIONAL FOREST

A cheerful crowd, out for a good time. This camp indicates one of the many recreational uses to which the National Forests are put.

their name and appearance, and become familiar with the different kinds of forest growth, while cabins could contain pictures of the birds and animals common to that section. In addition to miniature camps, it has been suggested that where suitable areas, advantageously located, can be found, a miniature forest might be laid out with trails, fire look-out towers, fire boxes, etc. This would give the children a chance to play at forest protection and learn the lesson of preservation of all forest life. It is really surprising what a small per cent of both children and grownups who find keen enjoyment in outdoor life have any conception of the enormous damage to forest life wrought by carelessness. Thus, in making the National Forests and Parks attractive, let us think of the children of today as the men and women of tomorrow. Let us so construct playgrounds for them that through play they will receive a taste for nature and the lessons it teaches.

To be sure such playgrounds will cost something to construct and maintain, as will all camp grounds or pleasure areas prepared for the public. The children, too, will need instruction and direction at such playgrounds if they are to secure the greatest use and enjoyment out of them. It has been found that an officer must be stationed at camp grounds to guard against

fire and assist the public, and to teach the children the use of these play camps. It is the child's nature to teach other children the play-games he has mastered, and thus will our little folks learn of outdoor joys and pleasures and return to their homes rosy-cheeked and happy—the better boys and girls.

UNIVERSITY EXHIBITS

The State College of Forestry at Syracuse University has had exhibits at eight fairs this fall. One feature of the exhibits showed an entire tree of Norway Spruce cut and sawed into various products, including two logs yielding eight foot boards, two fence posts, valuable if treated against decay, and one hop pole. The entire yield of the tree was fifty-nine board feet, and a chart which accompanied it gave cost and

profit figures per acre per year, at the rate of growth which this particular specimen had made. Other features were specimens of paper made from bark which would otherwise have been absolute waste, and numerous other things manufactured from wood, but seldom credited to the forest, such as articles of clothing from fiber silk, and twine made from twisted Kraft paper fiber, rugs, phonograph records, wood flour, fiber shingles and transparent sheets of viscose, a wood product used as a substitute for celluloid. Another feature was a group of wartime products, showing food, medicine and explosives yielded by the forest.



A FAIR FIELD AND NO FAVORITES!

The always exciting "fat man's race" at one of the picnics enjoyed by hundreds of people each year in the National Forests.



LESSONS THAT COME IN PLAY MAKE DEEPEST IMPRESSIONS ON CHILDREN

This young American is Frank McConnell, son of Ranger McConnell of the Colorado National Forest, and he and his trusty friend are busily engaged carrying to the Ranger Station mail and supplies which have been left by stage three quarters of a mile away.

HYBRID OAKS

BY GEORGE B. SUDWORTH

HYBRID oaks of this country are exceedingly interesting trees. They are the result of a natural crossing of two different species of oaks and, as a rule, they are strikingly distinct from other oaks in the peculiarly mingled characteristics of the parent species. Their distribution is very irregular, so that our knowledge of the ranges of the different forms is incomplete.

In all, there are approximately twenty different hybrid oaks now known. Nineteen of these inhabit Eastern United States, only one being known in the Pacific region, and none having been discovered in the Rocky Mountain Region*. The fact that 60 per cent of the forty-eight native species of oaks grow in the East may partly account for the correspondingly greater number of hybrid oaks discovered in that part of the country, where necessarily there would be greater opportunity offered for crosses.

There is no record of the crossing of white oaks and black oaks, all of the hybrid forms now known having been produced by crosses only between members of each of these two distinct tribes. Whether or not there is any inherent barrier to hybridization between white oaks and black oaks in the fact that the white oaks are annual fruiting trees and the black oaks are biennial fruiting species, is unknown.

A much larger number of black oak hybrids has been discovered than of white oak, there being sixteen black oak hybrids recorded and only four of white oak parentage. Whether or not the black oaks have a

greater tendency to hybridize than do white oaks, is unknown. The relatively more frequent association of different black oaks than is the case with white oaks may also be a determining factor in the greater occurrence of black oak hybrids.

The determination of what parent species of oaks have produced the various hybrids now known is a matter entirely of recognizing the distinguishing characteristics of the parents as exhibited in the hybrid. No one is prepared to prove the supposed parentage of any of the hybrid oaks, and obviously because the crossing

of the parent trees occurred without the aid of man. So far, no one appears to have tried artificially to reproduce any of these hybrid forms by cross-fertilization of their supposed parents. It is true, of course, that plant breeders in this country have had little or no incentive for crossing oak trees, because with the great variety of commercially useful species now available there

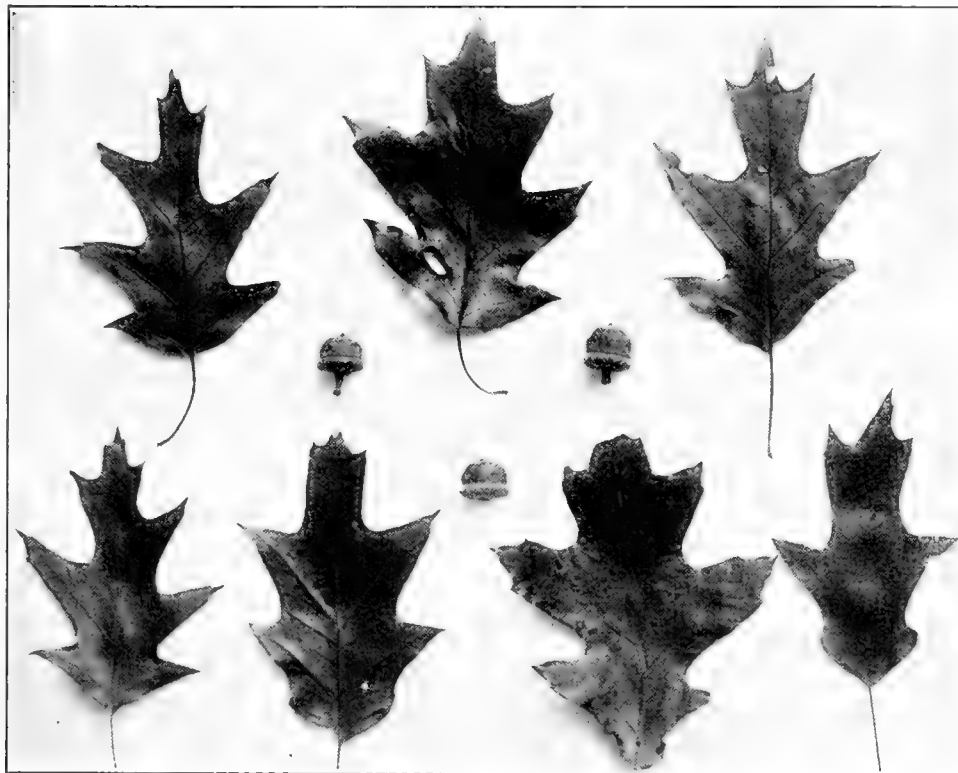


FIG. 1.—MATURE FOLIAGE AND ACORNS OF THE NEW HYBRID.

It will be seen that the shape and size of the leaves are very like those of the red oak, though many of them resemble the black oak more closely in shape, color and texture. The mature acorns are of the same general shape, though smaller, than those of the red oak.

would seem to be no pressing need of seeking new and better forms. Systematic botanists have contented themselves with naming and describing hybrid oaks just as they were found in nature, and have relied upon their judgment in determining the parentage. It is a noteworthy fact, however, that there is considerable difference of opinion among botanists as to the parentage of certain hybrid oaks. Thus, the parentage of one of the best known of our hybrid oaks, the Bartram Oak, first named *Quercus heterophylla*, has varied with the author from that of *Quercus phellos* x *velutina* and *Q. phellos* x

*Dr. William Trelease records (Proc. Am. Phil. Soc. LVI, 48, 1917), the existence of "*Q. arizonica* x *grisea*—*Q. organensis*", which was doubtless found in the southern Rocky Mountain Region. His very excellent paper on "Naming Hybrid Oaks" also lists a number of apparently hitherto unpublished hybrids which were unknown to me when this article was prepared.

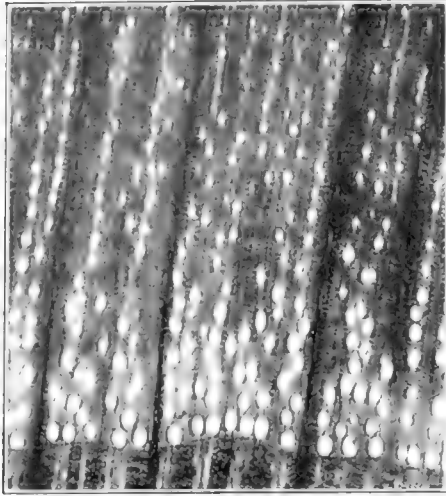


FIGURE 2.



FIGURE 3.

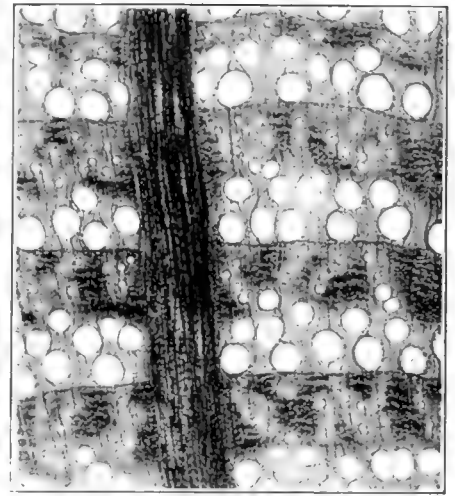


FIGURE 4.

PHOTOMICROGRAPHS WHICH MAKE POSSIBLE AN INTERESTING COMPARISON

A most superficial comparison of the cross-section of the wood of this new hybrid oak (Fig. 2) with that of *Quercus borealis* (Fig. 3; and *Quercus velutina* (Fig. 4) shows a unique distinction in the very large number of pores and in their gradual diminution in size in passing from the spring or early formed wood to the summer or late-formed wood of the annual ring. This would indicate that the new hybrid is more closely related to the red oak than to the black oak, in which there is a very abrupt change in size from the large pores of the spring-wood to the small pores of the summer wood.

coccinea to *Q. phellos* x *rubra* (1).

Well Known Hybrid Oaks.

The following is a list of the native hybrid oaks discovered in the United States during the last hundred years. Some of them have been found but once and in several instances the individuals discovered have since been destroyed. While a number of these trees are, undoubtedly, of hybrid origin, properly they must be designated as species, because they were first described under a binomial. Notable examples of such hybrids are *Quercus morehus*, *Q. brittoni*, *Q. leana*, *Q. sinuata*, and *Q. heterophylla*:

Quercus alba x *stellata* Engelm. (1877). Illinois.

Quercus alba x *macrocarpa* Engelm. (1877). Illinois and Vermont.

Quercus alba x *prinus* Engelm. (1877). District of Columbia and Vermont.

Quercus wislizeni x *kelloggii* Curran (1885);=*Quercus wislizeni* x *Californica* Sargent (1895);=*Q. morehus* Kellogg (1863). California.

Quercus coccinea x *ilicifolia* Gray (1867), near Whitinsville, Mass.

Quercus catesbaei x *aquatica* (2)

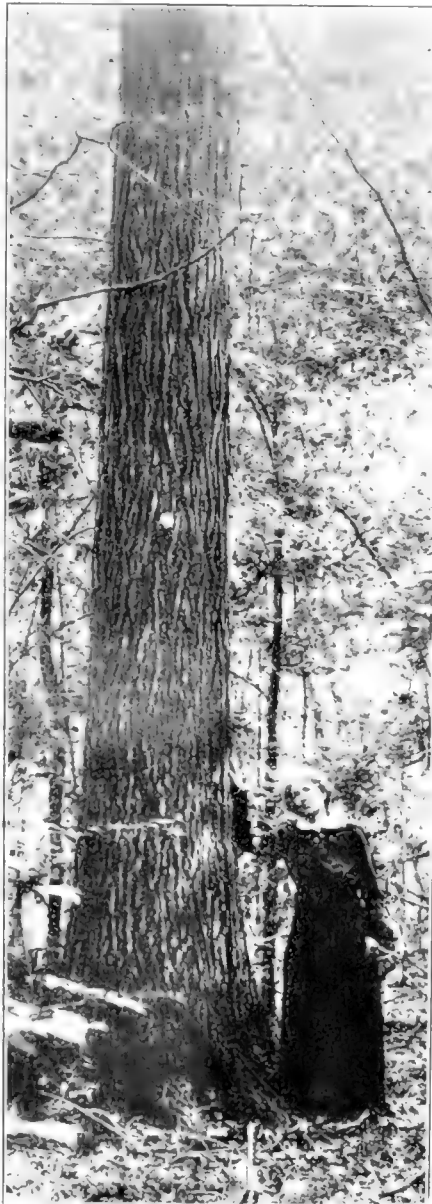


FIGURE 5.

Engelm. (1877);=*Q. catesbaei* x *nigra* Sarg. (1895);=*Q. sinuata* Walter (1788). Near Bluffton, S. C.

Quercus catesbaei x *laurifolia* Engelm. (1877). Near Bluffton, S. C.

Quercus catesbaei x *Q. cinerea* Small (1895). Florida.

Quercus cuneata x *velutina* (1917);=*Q. digitata* (3) x *velutina* Sudworth (1895). Tennessee.

Quercus georgiana x *marilandica* Sargent (1895);=*Q. georgiana* x *nigra* (4) Small (1895). Georgia.

Quercus marilandica x *ilicifolia* (1917);=*Q. brittoni* Davis (1892). The author of the latter name believed this tree to be a hybrid between the black jack and bear oak. Staten Island, N. Y.

Quercus marilandica x *velutina* Bush (1895). "Near Saputa, Indian Territory."

Quercus imbricaria x *marilandica* Sargent (1895);=*Q. imbricaria* x *nigra* (4) Engelm. (1877). Missouri.

Quercus imbricaria x *velutina* Sargent (1895);=*Q. imbricaria* x *coccinea* Engelm. (1877);=*Q. leana* Nutt. (1842). Central Eastern United States.

THE NEW HYBRID AND ITS DISCOVERER

This shows the new hybrid—the Hawkins Oak growing in a wooded section of the Hawkins estate in western Tennessee. It is some 85 feet high and 35 inches in diameter. Certain peculiarities about the tree attracted the attention of Mrs. Eugene Hawkins, prompting closer examination and the consequent discovery of the hybrid. Mrs. Hawkins is seen standing by the tree.

(1) Now properly known as *Quercus borealis* Michx., *Q. rubra* L., long supposed to have been applied by Linnaeus to our red oak, was in reality given to our Spanish oak, which most of the mountain people in Virginia, North Carolina and Tennessee call "red oak."

(2) Now known as *Quercus nigra*, the black jack, to which this name was so long applied, now being designated as *Q. marilandica*.

(3) Now known as *Quercus rubra*.

(4) Now known as *Quercus marilandica*.

Quercus imbricaria x *palustris* Engelm. (1877). Missouri.

Quercus phellos x *velutina*; = *Q. heterophylla* Michx. f. (1812). Pennsylvania, New Jersey, Delaware, Staten Island, N. Y.; District of Columbia, Virginia, North Carolina, Alabama, Texas.

Quercus phellos x *marilandica* Sargent (1895); = *Q. rudkini* Britt. (1882). Staten Island, N. Y.

Quercus phellos x *rubra* (1917); = *Q. phellos* x *Q. digitata* (3) Small (1895). North Carolina.

Quercus phellos x *ilicifolia* Peters (1893). New Jersey.

Quercus michauxii x *macrocarpa* Sudworth (1897). Southwestern Tennessee.

The Hawkins Oak, A New Hybrid.

Through the courtesy of Mr. Joseph Meehan my attention was called to a hybrid oak which Mrs. Eugene Hawkins discovered in Carroll county, West Tennessee, in October, 1912. An excellent photograph (Fig. 5) taken by Mr. W. R. Mattoon shows it to be some 85 feet high and 35 inches in diameter. The straight, slightly tapering trunk is free from branches for 40 feet. An interesting fact about this tree is that it is growing in a wooded section of the Hawkins estate which is itself a part of the original 25,000-acre grant made in 1791 to Mr. Hawkins' great-grandfather, Isaac Roberts, by the State of North Carolina, then included in a part of the latter state known as the Western District, but now a part of West Tennessee.

Being familiar with the forest trees in that section of Tennessee, Mrs. Hawkins noted with surprise that the flesh of mature acorns from this tree, at first taken to be a red oak (*Quercus borealis*), was a deep yellow, those of the true red oak having a whitish flesh. A further careful examination of the tree showed that the trunk bark (Fig. 5) resembles in its marking that of the black oak (*Quercus velutina*), while the shape and size of some of the leaves (Fig. 1) are very like those of the red oak. Many of the leaves, however, resemble in shape those of the black oak, to which they are all similar in color and texture. The mature acorns (Fig. 1) are of the same general shape as those of the red oak, but of smaller size, ranging in length from five-eighths to three-fourths of an inch and in diameter from five-eighths to eleven-sixteenths of an inch. Many

of the acorns show more or less distinct vertical stripes. The twigs and winter buds of this hybrid are so like those of the red oak as not to be distinguished.

A superficial comparison of a cross-section of the wood of this hybrid oak (Fig. 2) with that of *Quercus borealis* (Fig. 3) and of *Q. velutina* (Fig. 4) shows a unique distinction in the very large number of pores and in their gradual diminution in size in passing from the spring or early-formed wood to the summer or late-formed wood of the annual ring.* The gradual diminution in size of the pores in the wood of the hybrid would seem to indicate a closer relationship to the red oak than to the black oak, in which there is a very abrupt change in size from the large pores of the spring-wood to the small pores of the summer-wood.

It is proposed to designate this hybrid oak as *X Quercus hawkinsi*, in honor of its discoverer, Mrs. Eugene Hawkins, the writer's belief being that it originated from the crossing of *Quercus borealis* and *Quercus velutina*, both of which are growing in the vicinity of the hybrid tree. *Quercus palustris* also occurs in this locality and may possibly be one of the parents. The fact that the striped acorns of *Quercus palustris* have yellow flesh, and are similar in shape to those of the red oak supports this suspicion. On the other hand, however, the acorns of the black oak are striped and have a yellow flesh. Moreover, the similarly large size of the leaves of this hybrid oak with the color and texture of the black oak, and the close resemblance of the trunk bark to the black oak would seem to point more strongly to this species as one of the parents than to the pin oak.

So far as tested the acorns of *Quercus hawkinsi* appear to be only moderately fertile. Acorns planted by Mr. Joseph Meehan have produced one seedling, which is now about three years old, and a small quantity of acorns planted by the writer at the Letchworth Park Forest and Arboretum at Portage, N. Y., have yielded but one seedling. Some of the leaves of these young plants are identical in shape with those red oak seedlings of comparable age; while occasional leaves strongly resemble those of young black oak. It will be interesting later to note the types of adult leaves produced by these plants.

*The author's cordial thanks are extended to the Forest Products Laboratory at Madison, Wisconsin, for preparing these illustrations.

THE NATIONAL ASSOCIATION of Box Manufacturers, through an agreement with the United States Food Administration, is working out details of standardized wooden boxes for condensed milk, canned fruit and vegetables for export. The specifications cover the width, length and thicknesses of the sides, ends, tops and bottoms of the various types of boxes, the number and position of the nails to be used, the cleats and iron straps required, and the matching and glueing up of the pieces. A standard scale of prices for the different types of boxes delivered at any point east of the Missouri River has been agreed upon. The wooden box industry, through its association, will undertake to see that the Government's requirements for boxes are taken care of promptly.

THE RECEIPTS from the sale of timber on the National Forests in California amounted to \$154,271.92 for the fiscal year 1917. This is an increase of 59 per cent. over the receipts for the fiscal year 1913 and 100 per cent. over the receipts for 1915. Twenty-five per cent. of this money goes to the state for the school and road funds of the counties in which the National Forests are contained.

DR. HUGH P. BAKER, dean of the New York State College of Forestry, is at the Second Reserve Officers' Training Camp at Fort Sheridan, Illinois. There are many prominent lumbermen in training at this camp and their practical experience is proving useful.

A TREE THAT PRODUCES SOAP

AS a relatively new member of the American tree family the Soap-nut, *Sapindus utilis*, is entitled to friendly consideration. Originally the tree came to this country from China. The first importation was made into Florida by Rev. Benjamin Helm, who brought some of the seeds from the Orient more than 30 years ago. From these seeds only one fully developed tree is in existence and for many years the owner of this one had no thought that his tree produced anything of value.

It was in 1905 that American attention was first attracted to the soap-nut tree as a tree of importance in the matter of nut bearing. At that time there was published a report on the economic value of the tree prepared by United States Consul Kedder at Algiers. This report made possible the real development of soap-nut cultivation in America. Its publication was followed by generous importation of the seeds from Algiers, arranged by E. Moulie, who now lives in San Diego, Cal., and who had been instrumental in instigating Consul Kedder to make an investigation and report. The seeds imported by Mr.

Moulie were distributed free of charge to people who showed such interest as to indicate that the planting and cultivation would be done with care. In addition to making the importation of seeds Mr. Moulie has made it a practice to buy every year practically the entire crop of seeds from the original American tree, and these have been distributed broadcast. He estimates that as a re-

sult of these gifts there are now 500,000 soap-nut trees growing in Florida alone, and large numbers in other Southern States and in 19 foreign countries to which he sent seeds.

The planting and cultivation of these trees attracted widespread attention and the Department of Agriculture made some importations from China, materially increasing the number of trees planted in the United States.

Several important uses are attributed to the product of the soap-nut tree. The hull of the nut supplies raw material for the manufacture of soap and other articles which require an ingredient with saponaceous properties. This material may even be used as soap without compounding. By shredding the hull and using it with water as if it were soap, a perfect lather is readily obtained and some authorities state that the cleansing qualities are superior to manufactured soaps. The extract's efficiency as a foam producer makes it useful as an ingredient in carbonated beverages. The kernel yields a fixed oil, which some say for culinary purposes is equal to olive oil. Some



THE FRUIT OF THE SOAP-NUT TREE

From the hull of the nut is procured raw material for the manufacture of soap. The material may be used without compounding, as it makes a perfect lather. It is also useful for making beverages which require foam.

therapeutic value is also attributed to the nuts.

The wood of the tree is close grained, takes a good polish, and is said to be well adapted for furniture making. The tree grows to a height of 50 feet. It is not expected that it will be used for its timber, however, as the yield of nuts is said to be from \$10 to \$20 a year for each tree. The tree begins bearing at six years of age.

THE tremendous demand for forest products of all kinds which the war has created will by no means terminate with the cessation of hostilities. The reconstruction of Belgium and northern France will draw heavily upon the forests of the United States. The action of the Federal Government and the large lumber producers in the United States in sending Federal Trade Commissioners abroad for the purpose of studying export markets makes the future in the lumber business appear extremely bright. Authorities are predicting an increased demand for trained foresters during the next decade inasmuch as many phases of forest utilization are now demanding expert training which the trade did not require in the past.

THAT there is enough fuel wood in Indiana forests going to waste to run every heating and cooking stove in the state for a year is declared by the Indiana State Board of Forestry. The board argues that the fuel value of a cord of good beech, sugar or hickory wood equals that of a ton of soft coal, that the average price of wood is about half that of coal and that people pay double price for the luxury of burning coal. Owners of woodlots are advised that to remove the dead, dying and weed-trees will not only furnish a vast supply of fuel but will be of distinct advantage to the remaining trees. Municipal woodpiles are being advocated, to be supplied with fuel which could be obtained from woodlot owners for the cutting.

EDIBLE FRUITS OF FOREST TREES

IT is said that Daniel Boone and some of our other early pioneers could go into the wilderness with only a rifle and a sack of salt and live in comfort on the game and other wild food which the woods afforded. While few people want to try that sort of thing nowadays, persons who know the food value of the fruits of our native trees and shrubs are, according to foresters, able to use them to good advantage in supplementing other foods.

Aside from the numerous edible mushrooms, roots, fruits of shrubs and smaller plants, the trees of our forests afford a large variety of edibles which are highly prized by woods connoisseurs. First in importance, of course, are our native nuts—beech nuts, butternuts, walnuts, chestnuts and chinquapins, hazel nuts, and several kinds of hickory nuts, including pecans. The kernels of all of these are not only toothsome but highly nutritious, and are used by vegetarians to replace meat. The oil of the beech nut is said to be little inferior to olive oil, while that of butternuts and walnuts was used by some of the Indians for various purposes. The Indians, it is said, also formerly mixed chestnuts with cornmeal and made a bread which was baked in corn husks, like tomares. In parts of Europe bread is made from chestnuts alone. The chestnut crop in this country is being reduced each year by the chestnut blight disease, which in some sections is gradually killing out the tree.

Acorns are commonly thought to be fit only for feeding hogs, but many kinds of them can be made edible and nourishing for people as well. The Indian custom was to pound or grind the acorns up and leach out the tannin, which makes most of them unfit for eating when raw, by treating the pulp with hot water. The resulting flour, which contained considerable starch, was made either into a porridge or baked in small cakes of bread. As a rule, the acorns of the various white oaks having less tannin, are the ones best suited for food, but Indians also used those of the black oaks, even though they contain much tannin. The acorns of the basket or cow oak, the chinquapin oak, shin or Rocky Mountain oak, live oak, and of several other species, are sweet enough to be eaten raw.

Another nut which is not suited for eating raw, but from which a palatable food is said to have been prepared by the Indians, is the buckeye. The kernels of these nuts were dried, powdered, and freed of the poison which they contain when raw, by filtration. The resulting paste was either eaten cold or baked.

Several western pines have seeds which play an important part in the diet of the local Indians. Perhaps the best known of these is the fruit of the nut pine or pinon

which forms the basis for a local industry of some size. Not only is it extensively eaten by local settlers and Indians, but large quantities are shipped to the cities where the seed is roasted and sold on the street. The similar seed of the Parry pine and the large Digger pine seeds are eagerly sought by the Indians. The latter tree is said to have gained its name from its use as a food by the Digger Indians. The seeds of the longleaf pine are edible and are improved by roasting. Indeed, it may be said that most nuts are more digestible when roasted than if eaten raw.

One of the best-known fruits, the foresters say, is the persimmon, which is edible only after it is thoroughly ripe. As this is usually not until late in the fall, it is commonly thought that the fruit must be frostbitten. If the persimmon is eaten before it is well ripened, the tannic acid which the fruit contains has a strongly astringent effect, which justifies the story of the soldier in the Civil War who said he had eaten green persimmons so as to shrink his stomach up to fit his rations. The pawpaw, or custard apple, is also best when thoroughly ripe. The fruit of some species of haws is eaten or preserved in different parts of the country, while those of several different kinds of wild cherries have a food value and are used for various purposes. Wild plums are abundant in certain sections and occur in particularly plentiful quantities along the streams in the Eastern and Middle Western States.

Several varieties of wild crab apples make delicious jellies. Some of the largest, which attain the size of small apples, are more or less abundant throughout eastern North Carolina. Elderberries are frequently used for pies and for sauce. Those found in the West are sweeter and have a better flavor than the eastern varieties.

The berries of the hackberry, or sugar berry, as it is called in the South, are dry, but have an agreeable taste. Those of the mulberry are sweet and juicy when ripe. The mulberry is valued in some sections for feeding hogs and poultry and some species are occasionally cultivated.

Many people like the fruit of the shad bush, "sarvice" berry, or June berry, as it is variously called. In parts of the country this fruit is used to make jelly.

The French Canadians are said to use the acid flowers of the redbud, or Judas tree, in salads, while the buds and tender pods are pickled in vinegar. Honey locust pods, often locally called "honey-shucks," contain a sweetish, thick, cheeselike pulp, which is often eaten. Those of the mesquite furnish the Mexicans and Indians with a nutritious food. The Creoles of Louisiana, famous for their cookery, are reported to use the young buds of the sassafras as a substitute for okra in thickening soups

WOODLOT owners will be interested to know that birch, cherry, walnut, oak and mahogany have been approved for airplane propeller stock by the United States Government. Spruce is the principal wood used for the frames.

IT has recently been discovered that gum lumber immersed in pure gummed spirits of turpentine lasts many years longer when exposed to open air. The usual method of treating the lumber is to give it three coatings and allow it to thoroughly dry after each one.

FIGHTING THE PINE BLISTER DISEASE

MANY inquiries come to AMERICAN FORESTRY asking if it is possible to eradicate the pine blister disease or prevent it spreading by spraying. No spray has been found which can be used effectively against the blister rust either on pines, currant or gooseberry bushes. Spraying is not recommended, because the disease spreads very rapidly on currants and to considerable distances. A number of tests have been made by men who realize the necessity for careful work and who presumably did the most thorough work possible under the circumstances. In Europe, Ewert attempted to spray black currant bushes thoroughly enough to keep the disease off them. He concluded that it was impossible to do it. A similar attempt was made by McCubbin in Ontario two years ago. He sprayed every two weeks and also concluded that it was an impossibility to keep the disease entirely off the sprayed bushes. Other attempts have been made in different localities with the same results. Unless absolute freedom can be secured from this disease, spraying is inefficient, since a single rust pustule is sufficient to start the disease upon neighboring currants. The disease is known to jump from currant to currant at least one-half mile, and under favorable conditions it jumps several miles.

The question of securing a resistant variety of currant or gooseberry is still in need of further investigation. It is desired that scouts send in to Dr. Perley Spaulding, United States Department of Agriculture, at Washington, cuttings of currants and gooseberries which show marked resistance to the disease. Only cuttings of apparently resistant uninfected plants which are under very severe test conditions, that is, with heavily infected bushes within a few feet, need be sent in. Wrap specimens in damp (not wet) moss or dead leaves and label with your own name, place where collected and date. State briefly why the specimen is thought to be resistant.

Experiments are being carried on to obtain if possible some cheap chemical which will kill wild currant and gooseberry bushes. Over 500 experiments are in progress, using different chemicals and methods. Various derivatives of arsenic, sulphur and ammonia are being used as a spray to kill the foliage. Fuel oil is also being tried. Plots were sprayed with fuel oil and two days later burned over without good results. The soil about the plants in one series of experimental plots is being treated with dry chemicals such as salt, calcium chloride and sodium carbonate. Sodium arsenite, sodium cyanide and fuel oil are injected into the soil near the roots of bushes in liquid form. Some of the gaseous chemicals employed are sodium sulphid, sodium bisulphid, chloride of lime, calcium carbide, carbon bisulphid, formalin, chlorine water, hydrogen sulphid water, turpentine, nitro-benzine derivatives, crude carbolic acid, etc. These

substances are placed in the soil around the roots of wild currant and gooseberry bushes in various quantities.

Thus far the use of chemicals as outlined above has met with very little success. In addition, mechanical methods of removal are being tested to determine comparative costs and efficiency in preventing sprouting from the roots.

Where men are otherwise liable to the draft, no exemptions, either permanent or temporary, have been granted to Government blister rust workers. However, it is possible that temporary delay in reporting for duty until after the close of the present season's work may be secured for men whose services are highly necessary for the conduct of the work. No request for delay in draft can be made until the men are notified to report for duty at the army camps. It was announced that 30 per cent of the quota of each district would be called on September 5, the next 30 per cent September 15 and another 30 per cent on September 30. The remaining 10 per cent was to be mobilized as soon after that date as possible.

The following are the conclusions reached by experts who have made a study of the pine blister disease:

The essential thing in controlling the blister rust is to get out all currant and gooseberry bushes. The most effective time for doing this is in the early spring, and this part of the season should be used for rescouting control areas.

It is not feasible to spend time and money in scouting and eradicating diseased pine in New England, except where there may be outbreaks of the disease in new territory.

The establishment of control areas, in which all currant and gooseberry bushes, both wild and cultivated, shall be eradicated as far as possible, is regarded as the most practicable means of limiting the ravages of white pine blister rust; and owners of pine woods are urged to co-operate with state authorities to control the disease in their several localities.

In the expenditure of funds appropriated for blister rust work, the following plans are generally approved.

1. The method of direct state experimental areas to determine the cost of control by means of the eradication of wild and domestic bushes under various conditions; and,
2. such co-operation with private owners as will give expert direction or supervision to their work.

Localities established as control areas should be scouted at least four successive years for currants and gooseberry bushes.

Men inspecting should be required to carry whisk brooms and to brush their entire clothing with these after dipping them into disinfectant when circumstances require, also thoroughly to wash their hands and arms.

OUR FOREST RESOURCES AND THE WAR

BY E. A. STERLING

IF our newspapers some morning should proclaim in a double-ribbon head that "Lumber Wins the War," it would but little over-emphasize the indispensable part our forest resources are playing in achieving ultimate victory. Such a headline will not be seen, but the papers can safely say any day or every day that the war cannot be won without lumber.

It is all so big that more than a meager comprehension of what is going on along any line is impossible now. The wonderful accomplishments come from a co-ordination of effort, requiring the combined use of many materials. What is big today may be small tomorrow while headline news developed at one point might lose significance if it was known what was really going on somewhere else. The perspective will have to come later. From the isolated facts now known comes the realization that of all of our wonderful natural resources, industries and facilities of every kind, which are being drawn on to the utmost, forests and their products are in the front rank.

Our use of materials, enormous as it was in normal times, has been increased beyond precedent to fill military requirements. It is one of the saving factors for America and the whole Allied cause, that this nation was so blessed with its resources of iron, coal, lumber and food-stuffs. It is as true now as when Adams Smith first wrote the obvious fact, that the source of practically all income and materials, is the soil. Today the earth produces the ore for the steel; the coal for the fuel; the forests for the lumber and the grain for the food, which give America and her Allies the supremacy that will win the war. We all know these things without many fully realizing their significance. It is only when some essential is no longer available that its indispensable character is revealed. We take it for granted that coal and iron will be mined, and steel made for the guns, and myriad other military appliances. We need wood for shelter, ships, and many other construction purposes, and simply go and cut it from the forests. The steps in the production, transportation and fabrication of these materials are lost sight of, as is also the fact that they are basic natural resources without which no country can prosper, much less win a war.

Our forest resources are producing material as indispensable as steel. Wood is demanded for war purposes because of the well known but rarely thought of characteristics which make it the most widely used building material. It is indispensable both in war and peace because it is available everywhere; can be readily cut and shaped in any size or form; because it combines great strength with lightness; is easily worked and adaptable; is obtainable in kinds and grades for all purposes, and is a non-conductor of heat. It is natural, therefore, that it should

be one of the materials in greatest demand for war purposes.

To say that two or three billion board feet of lumber are being produced in the shortest possible time to meet the most urgent war needs the country has ever known, conveys very little. Even to say that a single billion feet would make a boardwalk ten feet wide from New York to Petrograd, via Vladivostok, really does not convey the full impression. As a matter of fact, no one really knows just how much wood is being used in our war preparations, nor does the number of feet especially matter. It is extremely important, however, to know that our forest resources are fully able to meet the unprecedented demands upon them, and to do it without materially reducing our reserve timber supply. It is equally important that the producing facilities of the lumber industry are able to shift from normal routine and produce sizes, kinds and quantities of timber as needed by the military authorities.

In the war news for many months have been frequent references to wooden ships, the army cantonments, and the new airplane fleet. These are among the large items in which wood is almost the exclusive construction material. In addition, however, are the docks and wharves, both here and in France, the warehouses, boxing and crating lumber, hangars and hundreds of smaller uses. The necessary kinds of wood required for all of these things, the unusual specifications and sizes, the large orders for wooden items which usually are produced only in small quantities, and the necessity for haste in production, indicate the diversity of demands which the forests must meet.

A Washington dispatch in late October reported over 45,000 cars of lumber shipped for government war purposes or orders distributed alone by the Committee on Lumber of the Council of National Defense. This gives a clew as to the magnitude of the war lumber output, yet is only a beginning. Nor do these 45,000 carloads, which would make a train 500 miles long, represent the total consumption, many orders being placed through sources other than the Lumber Committee.

The indispensable character of the lumber required is shown by the many purposes for which it is used. The National Guard camps and National Army cantonments comprise hundreds, if not thousands, of acres of wooden buildings. At one camp 50 carloads of materials were unloaded a day for the construction of 746 buildings, in which over 30,000,000 feet of lumber was used. Warehouses and cold-storage plants require millions of feet. About 900 carloads of dock and bridge timbers and other construction materials have been cut for export for American army purposes in France. Nearly 4,000 carloads of yellow pine alone have been shipped for wooden

ship construction, besides nearly as much fir and hardwood. Each wooden ship requires about a million and a half board feet, in addition to that used for the ways and scaffolds. Aviation schools and camps, army trucks and boxes, take millions of feet more.

Just as items: One hundred and thirty thousand pieces of piling for docks were in one order, while another government requisition called for 20,000,000 ammunition boxes, all to be made of wood. If these piles averaged 30 feet long, they would extend 800 miles, or nearly from New York to Chicago, if placed end to end. At Washington 10,000,000 feet of lumber has been ordered for new frame structures to accommodate army bureaus. At one government shipyard, somewhere on the Atlantic Coast, 50,000,000 feet of heavy lumber and timber is needed for ways and general purposes. One Pacific Coast emergency lumber bureau has received orders for nearly half a billion feet of one kind of wood; while for air-craft stock well over 100,000,000 feet of spruce alone will be required. In September contracts were awarded by France for 24,000,000 feet of spruce; Italy, 9,000,000 feet, and England 36,000,000 feet. Lumber for portable or collapsible military buildings of various kinds, for the use of the American Army in France, has just been requested. The first order is for about 15,000,000 feet, with ultimate needs aggregating several hundred million feet. Creosoted wood block flooring is to be used in government munition plants. An order for 38,000 yards, equivalent to two miles of street paving, is soon to be placed. These are but examples of the demands which our forests are meeting.

A hundred years ago, before the days of steel ships, treenails were a well-known product of the forest, but with the decline of wooden ship building, their production practically ceased. With the inauguration of the present shipbuilding program, treenails were suddenly in demand in greater quantities than ever before, with the result that emergency measures had to be taken to insure a supply. Locust is preferred to all other woods for this purpose, but since the supply is not sufficient, several other woods are now used in their manufacture. It perhaps should be explained that these treenails are long wooden pins, cut 20 to 26 inches long and $1\frac{1}{4}$ inches in diameter. This is one example of the new demands which have been faced and met in supplying wooden products for war purposes.

We have accepted our forest resources as a matter of course, using them in many cases none too wisely. With a standing timber supply which is still sufficient to take care of all requirements for many years to come, lumber has simply been cut where most available and as needed. The lumber industry has strong resources, and is directed by men able to meet any emergency such as at present exists.

Every conceivable war requirement for wood can be met, although, of course, in some cases not as promptly as might be desired. In the western forests alone there are almost 4,000 miles of logging railroad, 870 logging locomotives, 13,000 cars and other necessary equipment. With a normal annual lumber output valued at over half

a billion dollars, mill and logging facilities were fortunately available for the production of diversified forest products for war purposes, which have a value beyond any dollars and cents figures because indispensable in the preparations for victory.

It should be remembered, too, that while the military needs are being taken care of, lumber for the every-day needs of the country is being produced as well. This alone, even with the decrease in building operations, will not fall far below 40,000,000,000 feet per year. Although their importance transcends all else, the war requirements are a comparatively small percentage of the total output. The emergency which the lumber industry has met has not been in the volume of the wood required, but rather in the urgency and special requirements.

When peace is attained—with victory—and the mills cut only for the normal requirements of peace and for reconstruction in Europe, it will be found that our forests have fully met the unusual demands upon them, and remain one of our greatest natural resources. It would be most gratifying if out of this crisis should grow a better public realization of the part the forests play in the economic stability of the nation. We shall always need wood for construction, fuel and the arts of civilization; the forests alone can supply it.

THE New York State College of Forestry at Syracuse has recently sent out a circular letter to Chambers of Commerce throughout the state warning against the ravages of the tussock moth, which bid fair to be severe on shade trees during the next growing season. The egg masses, which are white and conspicuous, may be seen readily at the present time on the bark of elms particularly, and these may be collected and destroyed or daubed with creosote so that they will not hatch. The college, in its letter, has suggested that local shade tree or park commissions take the matter of destroying the egg masses in hand at once and push it vigorously.

THE College of Agriculture, Cornell University, offers three courses in vegetable gardening during the short-course term which extends through a period of 12 weeks from November 7 to February 15. Two of these courses, one in commercial vegetable gardening, and the other in vegetable forcing or greenhouse vegetable culture, are planned to be of special value to those who contemplate vegetable gardening as a life work. The course in home vegetable gardening is designed to meet the requirements of those desiring to secure a general knowledge of the principles of vegetable production for home use.

PLANS for a model after-the-war camp at Mount Gretna for Pennsylvania's National Guard have been discussed lately between officials of the Adjutant-General's Office and the Department of Forestry. These plans take into account the increased productivity, capacity and general beautification of the fifteen hundred acres of timberland included in the State's two-thousand acre military reservation.

EDITORIAL

FORESTRY AS A PROFESSION FOR YOUNG MEN IN THE UNITED STATES

THE great war has brought home to our people a number of very interesting facts regarding the necessity for and the extensive use of wood, and with this, the importance of the forest and its proper care. Suddenly we learn that wood is not merely useful as lumber, fuel, telegraph poles and pulp wood for newspapers, but that even in this age of steel and cement we want enormous quantities of wood for ships and camps, for railways and corduroy at the front, a hundred million feet or more of high-grade spruce for airplanes.

Beyond this, we find that wood is made into clothing, bedding, fiber for fiber cases and shoe soles, in short, that it may be converted into anything from paper collars to carwheels.

Even this does not exhaust the list, for the laboratory now tells us that sugar, and drinkable alcohol, as well as the old products of wood alcohol, wood vinegar, etc., can be and are made and used in enormous quantities.

War has taught us also the simple fact, well known to foresters but apparently unknown to our statesmen, that a country with its forestry work properly organized and supported has 20 years' supply of timber constantly stored up and ready for use. Forestry has saved Germany in this period of need.

The sudden war demands have called attention to the fact that while mere brush and uncared for woods, such as are now a great part of our eastern woodlands, may help the landscape in looks, and may be good hunting ground, they are not forest, and are of little use now when the United States needs one hundred and fifty million feet of select spruce for flying machines.

The nation has been stirred up in the last six months regarding the importance of using our soil to its full capacity, and we are discovering that the choice of the right crop is foremost in this work, and also that on hundreds of millions of acres the right and only crop is the forest crop.

Our people realize now as never before that the food, clothing and housing materials are products of the soil, that they need land, labor and time for their production, and especially that the forest crop needs a long time—that the spruce planted today requires a century and more to make fit stock for airplanes.

It is beginning to dawn on some of the people in power that this care of one of the great crops of the world, the care and planning for properties for a century hence, requires a little more than a mere wood chopper, and that certainly it requires policies which have some show of continuance.

What great field this offers for the young men choosing

a profession. Today we have a consumption, in peace times, of over forty billion feet of lumber alone; a forest area of about five hundred million acres, or more than 16 times the State of New York, and a population over one hundred million, and rapidly growing in numbers and in wealth and in its demands on the forest. And the care of this empire, the production of this yearly timber crop for the greatest people of the earth speaking one language, this great task is the work of the American forester.

A fine beginning has been made. Thirty years ago forestry was not yet in our dictionary; there was not a forester in the land with an acre of woods or a log of timber to sell. Today the Forester of the United States cares for over one hundred and forty million acres, an area larger than the combined area of all the forests of the German Empire; and today the Forester offers timber for sale in quantities of over five hundred million feet, and is in position to offer more than any other person in the world.

A number of schools have begun to prepare men for this work, but so far the supply of real foresters is in no proportion to the task before the profession.

In Germany a forester cares for about 10,000 acres of forest and usually has two to four assistants. On this scale we would need a body of 50,000 foresters and about 200,000 assistants, besides a large body of specially trained labor, to care for our woods as they should be cared for. Today not the hundredth part of this number of available men exists in our country.

The American way is not to run after the salesman—the man who has his labor or his goods to offer must hustle and prove his worth.

It is a safe estimate that 10,000 good, capable, honest and industrious men can find employment in the forest work just as fast as they really hustle and prove that they are worth having. And 5,000 more of stronger men can force their way into the forest business and acquire forest property and be their own foresters.

In Central Europe the forester is an educated, respectable and respected man, a power in his community, useful in times of peace and exceptionally useful and efficient in time of war.

In the United States the young forester (for so far there are practically no others) has already made a fine reputation for himself. He has established a real administration over millions of acres of forest, over billions of dollars worth of property; he has surveyed millions of acres, built hundreds of miles of roads, trails and telephone lines. He has not only organized a fine protection for public forests, but has done this also for private

organizations, which in the past failed entirely in this effort.

The forester in the United States has proven himself a public servant of the highest order and value.

A forester's life is one of the finest that any enterprising, hardy man can desire; work and hardships mingle with leisure and freedom, and to this is added variety in work and variety in place, the out-of-doors and a clean and beautiful environment. His work is not of the petty three-cent clerk character; he deals with large things, thousands of acres, millions of timber. The salary of the forester is good in the Old World and is good here. In the United States service it has been rather low, considering the high cost of living and special expenses, and it is to be hoped that Congress will see the necessity of substantial advances. But even here the forester has fared just as well and even better than the teacher, the doctor, lawyer, etc. Considering the length of time, the lack of experience, etc., the forester in the United States has fared well. When young men of just fair capacity and only four to eight years' experience draw \$2,000 and as high as \$4,000 per year, while good teachers of 20 years' experience work for \$2,000, there should be little complaint.

This statement would be incomplete without a word on the course of study which the forester pursues at school. The course in forestry normally takes up—in sciences—mathematics, physics, chemistry, geology and mineralogy, botany and zoology; then also surveying, including map making, besides the usual courses in forestry proper which take up about 40 per cent of the time. This program is so well planned, has been fully tried for years, has proven useful in so many cases for work in other lines besides forestry, that it is not at all boastful to say that a student who takes a forestry course is far more certain of a useful, well-balanced science course than is the student who trusts his own immature judgment and the enthusiastic pleadings of the various specialist teachers.

To sum up: The field is immense in its extent, interesting and enjoyable in character and appreciative in its pay. The United States has the forests and lands—the people, the industries. We need the foresters and we shall have the foresters. The forester even now is making himself felt the length and breadth of the land, and in this hour of war he is proving a fit rival of his colleagues abroad.

BAD FOREST FIRE SEASON

THE total number of fires extinguished by private, state and Forest Service employes during the past season in the Pacific Northwest was 7,688, of which 938 were classed as bad fires. All interests for forest protection combined employed 2,579 regular patrolmen outside of about 12,000 extra fire fighters, the total expenditure for fire protection by all concerned being \$1,825,000. Since the extremely disastrous fires of 1910 aroused public sentiment against fires, a closer co-operation between private, state and national agencies has done much to reduce the number of fires that start in dry times and still more to prevent the fires that do occur from destroying large areas of valuable timber.

Especially energetic measures were undertaken during the past season by some of the state authorities. In August the Governor of Oregon placed detachments of troops throughout the state where trouble prevailed and incendiary fires stopped at once. The Governor also

closed the hunting season after it had been open for a week. In the State of Washington the forest fire wardens controlled bad fires at the expense of those responsible for their origin and this provision of the Washington law has been commended by authorities in other states.

During the past season 650 forest patrolmen, together with the necessary extra help, extinguished 2,388 fires on the holdings of the members of the Western Forestry and Conservation Association. The season was one of the driest on record and most favorable for the origin and spread of destructive fires. Yet the actual loss of timber this last year was very much less than in previous bad years due to the increasing effectiveness of fire-prevention measures carried out by the timberland owners, whose patrolmen kept watch over an area totaling 21,326,000 acres. The timber landowners of this territory spent \$290,000 for fire prevention work.

NOTIFICATION has been given by the United States Shipping Board that Southern pine manufacturers will be called on by the government to furnish during the next 12 months timbers for the construction of 100 more wooden ships, in addition to the 144 schedules which had already been placed with mills. This means approximately half a billion feet of timbers will have to be produced for the government in the Southern pine territory within a year. Four hundred million feet will go into ships, and one hundred million feet will be needed for ways, docks, props, houses and other uses at shipbuilding sites.

BIRDS and Food Conservation are the subject of a war bulletin issued by the Conservation Department of the General Federation of Women's Clubs, of which Mrs. John Dickinson Sherman, of Chicago, is chairman. This leaflet urges the protection of birds because of their value as destroyers of insects. Startling figures are cited, showing that in Massachusetts alone the authorities estimate one day's work by the birds to be the destruction of 21,000 bushels of insects, while in Nebraska it is estimated that the destruction amounts to 170 car loads a day. In the leaflet club women are urged to do their share in protecting the birds, by seeing that the laws are enforced.

HOW A SUCCESSFUL SUBURBAN HOUSE IS BUILT

BY RAWSON W. HADDON

WHEN we see a thoroughly successful house—one that seems well designed and conveniently planned—we are apt to be so much interested in the external successes that we give little or no attention or consideration to the less prominent details of construction which made very largely for the general success of the work.

In our admiration of the structure we, as mere spectators, are apt to think far more of how well proportioned a room is, or how convenient the stairs, than of how carefully the building materials have been chosen to assure durability and consistency with the general design of the house.

Of course, good design and substantial construction are of quite equal importance to the home builder, and in the extreme case, a slightly less well designed but carefully built house would be preferable to one that is well designed but not substantially constructed.

And structure must be as carefully considered by the architect as must the design, and a thorough knowledge of the comparative merits of various available materials is as essential to his success as a thorough knowledge of the rules and theories of architectural design.

When you build your house you will do well, in selecting an architect, to choose a man whose horror of flimsy beams and undersized or poorly selected studs is as great as his

dislike for houses in which one must go through one bedroom to get to another, or other equally uncomfortable errors in design.

In the American house of today—just as in the American house for the last two hundred and fifty-odd years—wood is the most generally used and most successful building material. But the earlier builders used only that material nearest at hand, which they could cut down within hauling distance of the building site or that which they could buy in their immediate neighborhood while we, today, not only have greater facilities for transporting material to fit our requirements of design and exposure or expense, but we also know

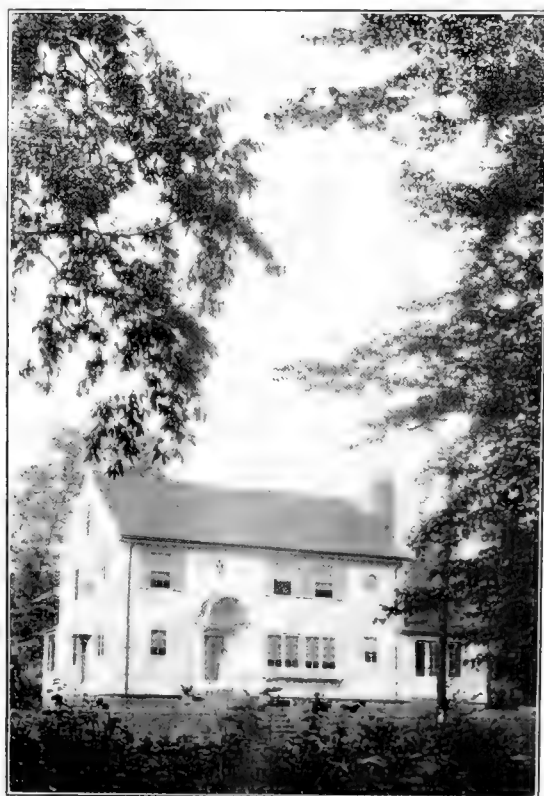
more about the comparative durability of various sorts of wood and their adaptability to various purposes.

The successful architect does not use haphazard methods in choosing his materials and each piece of lumber that goes into the building is used because experience has shown the architect that the material chosen is the best fitted to stand all the conditions imposed upon it in the part of the building where it is found.

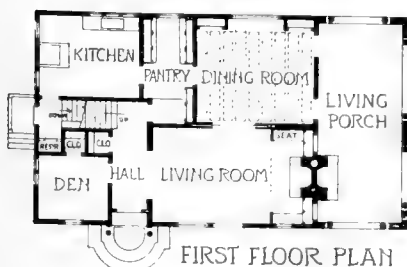
For this reason it seldom happens that any single kind of wood is used throughout the house, and instead of being a white pine or cedar house, many woods will be used, each in the place where it will give the best results, and your house will have



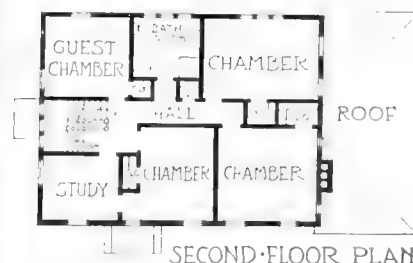
View of the DeVries home. B. E. Muller architect. Red roses will eventually be grown over the lattice in a solid mass to the top of the first story windows.



View of the Warner house. Bernard E. Muller architect.



First floor plan of the Warner house.



Second floor plan of the Warner house.

in various parts of it pine, spruce, cedar, oak, cypress, birch, maple and perhaps other woods.

The architect's duty, then, is to know just where and how each piece of wood is to be used and where each will give the greatest wear, where it is best fitted as a medium for carrying out the design (as white pine for delicate curving or mouldings) and what can be used to insure the least yearly expense in upkeep and repair.

A good example of successful design coupled with good construction is found in the William R. DeVries house, designed by Mr. Bernhardt E. Muller, of New York City.

In its exterior design and in its plan, the house is extremely interesting. While built along Colonial lines the design is not so strictly Colonial as to be oppressing in its imitation of the original type but is simply a free, modernized and, as one may say, humanized design following old lines. The triple casement window, for instance, is decidedly non-colonial, but it indicates to us the presence of a bright, open and airy living room and the three windows above this seem to suggest that the owner's bedroom in back of them and that it, too, is a cheerful and airy room.

The entrance porch is nearer the original style, however, and it is interesting to note how much is gained in general softness and interest in the design by the use of generous planting around the house as shown in the photograph of present conditions as compared with those before the plants had grown.

The DeVries house cost to build about \$15,000. In plan it is practically the same as the Warner house, designed by the same architect and also illustrated here.

At an earlier period of architectural

practice in America the house would have been built of the same material throughout.

At present the knowledge and selection of wood is an important part of architectural education. And it is of equal interest—though the knowledge is not of such extreme importance—to the person who is building or eventually will build a home of his own. And it might be said parenthetically that this latter class includes, or should include, every man and woman in America.

In addition to being an example of good suburban house planning the DeVries house is of interest because of the fact that it illustrates the results of the careful study made by the architect of the sorts of wood best fitted for every detail of the house.

In this study some conclusion may have been reached which will not be generally accepted without differences of opinion here and there. And it must be recognized that various considerations such as conditions of climate and exposure and the supply found in local markets will cause changes to be made in many instances. But the results are as a rule those accepted in general practice. They show us if nothing more, at least how many details the architect must consider in the building of a house.

As a result of his study of lumber, Mr. Muller has found it advisable to call, in his specifications, for not simply one or two, but for at least ten different varieties of wood to go into the construction of this particular house.

White pine he considered the most satisfactory and least expensive material for the exposed exterior detail. This includes window sills, casings and sash, the cornice, the entrance door and porch as well as the main porch and the entire cornice. The exterior walls and roof are shingled with white cedar shingles, those on the wall are twenty inches long and twelve inches to the weather, while the roof shingles are sixteen inches long and are exposed four and one-half inches to their length.

The entire framing, including the joists, headers, studs, beams, roof rafters, sheathing and also the rough (or under) flooring is of spruce.

Finished floors differ in various parts of the house. In the main rooms they are oak. The kitchen and pantry floors are maple, while the rooms on the second and third floors and the porch floors are North Carolina pine.

How carefully the subject must be gone into is demonstrated in the cast of the windows where such fine distinctions are made in specifying as that while the sills, casing and sash which must meet extreme exposure are to be of "clear, sound, well-seasoned white pine" the jambs and parting strips are to be of "comb grained southern yellow pine well-seasoned and free from pitch and other imperfections."

In his study of structural wood the architect soon finds that conditions vary quite sharply in many important respects in different parts of the country. Most important of these, perhaps, for present consideration, is the kind and quality of lumber grown in the immediate section of the country in which the house is to be built.

In the instance of the present design it will be seen that important variations would be necessary from Mr. Muller's specification to meet climatic considerations and to obtain the best materials available in the local markets at the least cost, if it had been built in California, or in the Lake States, for instance. For building in the New England states the arrangement of structural woods as specified by the architect would be most satisfactory and economical in all respects. It is not suggested as a general specification, however, and would hardly apply in other sections of the country.

As an example of the importance this knowledge on the part of the architect, it will be noted that while North Carolina pine is specified in this house for the floors only, by referring back to the article on Building Bungalows which appeared in the April 1917 number of the magazine, it will be remembered that in the case of the two bungalows at Southern Pines, N. C., designed by Mr. Aymar Embury, of New York city, North Carolina pine was used throughout for the reason that it was the best and most economical material for use in the location in which the houses were built.

For the present house, it will be seen that if the place of erection were the Middle West, the use of spruce for the framing, studding, rafters, etc., would call for a material which is not usually carried by dealers outside of the New England market. By substituting southern yellow pine,



An attractive vista, giving a suggestion of the harmony of architectural and landscape treatment of the DeVries home.



Doorway of the DeVries house, showing the perfect lines of the portal and the simple effectiveness of the growing plants.

North Carolina pine or hemlock for the spruce, according to what kind happened to be most available and cheapest in the local market, equally satisfactory results would be obtained.

For the roof and siding it would, of course, be found desirable to substitute red cedar or cypress for the white cedar shingles in some localities, and they would serve the purpose equally well.

When you build, the architect you employ may not agree with this specification in all its details and if he does not the difference of opinion will probably be caused by some substantial consideration, but under most conditions the following list taken from the De Vries house specification will assist you in securing the most satisfactory materials for even the parts of the house of seemingly small importance:

Framing—Spruce, including lathing, joints, headers, studs, roof rafters, sheathing and rough flooring.

Exterior Walls—White cedar, 20 inches long, 12 inches to the weather.

Roof—White cedar, 16 inches long, 4½ inches to the weather.

Windows—White pine sills, casings and sash; jambs comb grained southern yellow pine.

Exterior Cornice—White pine.

Porches—White pine including hood over front door.

Flower Boxes—Cypress.

Stoops—Cypress.

Exterior Doors—White pine.

Exterior door jambs—White pine.

Exterior and interior door thresholds—Quartered white oak.

Floors (under floor) — North Carolina pine.

Floors (finished) — North Carolina pine, second and third floor rooms; North Carolina pine, porches; maple, kitchen and pantry; white oak, main rooms.

Stair—Quartered white oak, main stair from first to second floor; strings, treads and risers of other stairs are hard maple.

Handrail—Main stair quarter sawed white oak; birch, cellar and attic stairs; (balusters cypress).

Interior Finish—White oak, first floor, unless one exception is made for special work; cypress, pantry and kitchen; white-wood, hall, living room and rooms on second floor.

Drainboard in Kitchen—Ash.

The selection of materials with which to build is followed by the equally important, though less generally understood, selection of mediums that will give to these materials the best possible results in good looks. This includes the selection and proper application and use of paints and stains for both interior and exterior work.

On the whole this subject is one in which the architect has a far smaller range of choice than he has in most other matters.

The selection is limited to the products of a certain number of firms and these he must experiment with until at last he finds the product best fitted for the needs of the particular house and the one which experience has shown will give the best satisfaction in wear and which shows the smallest tendencies to become worn out or shabby in the course of time.

A series of articles to be printed in American Forestry in the near future will illustrate the typical well-designed house in various other sections of the country with a discussion of the most economical and satisfactory materials for use in their erection in at least as much detail as has been done in the present instance for a house in the New England states.

Dynamite For Planting Pecans.

"For several years we have used dynamite to blast our tree holes," says G. P. Gill, President New York-Georgia Pecan Company. Pecans are our specialty. We have learned from experience that these trees planted in blasted holes do much better than in spade-dug holes. It is our conclusion that a pecan tree planted in a dynamited hole will in the course of several years catch up with in growth a tree planted several years previously in a dug hole; that is, assuming that both trees are in the same kind of soil and have the same cultivation and care. I regard this as important because every pecan grower desires to get his grove into bearing as soon as possible. Nut trees are slow growers at best; anything that will hasten their growth and convert them into money makers sooner is naturally a good idea.

"There has never been any question about the advisability of blasting tree holes in very hard soil but there has been considerable doubt expressed as to whether it pays to blast soil that is not very hard. Our soil is of the lighter type. We have found it has paid us many times over to blast."

Nurseryman Recommends Blasting.

James S. McGlennon, Florida, a nurseryman, also writes that he is frequently asked whether he recommends dynamite for making tree holes. As there seems to be so much interest in the subject, he says: "I would not think of planting a tree or shrub without blasting the soil unless it were one of the open soil types that would not need any breaking up. I feel that even a common gooseberry bush will mature enough earlier and bear enough heavier to warrant the expense if the planting is to be done in any of the hard soil types."

Attention is directed to American Forestry's list of books on Forestry, on page 703 of this issue. In this list is a comprehensive collection of titles and authors attractive to all interested in the bibliography of trees and related subjects. These and many other books may be ordered through the American Forestry Association. Prices quoted are by mail or express, prepaid.

BOOK REVIEWS

Wood and Other Organic Structural Materials, by Charles H. Snow, C. E., Sc. D. McGraw-Hill Book Company, Inc., New York. Price, \$5.

Designed for engineers, architects, students of technology, teachers of manual training and those who use structural materials, this book takes for its purpose the presentation of general and physical characteristics of a group of these materials. Among those considered are woods, paints and varnishes—with their associated oils, pigments, gums and resins—glues, creosotes and India rubber. The work is comprehensive. In its subdivisions it treats of the uses of wood, the reasons for preferring wood to other materials, the value of forests and forestry, wood protection, fire-proofing and preservation, and many other subjects of related character. The author is dean of the school of applied science at New York University. He has given exhaustive study to his subject and has provided a vast amount of information of value, based on the premise that practical knowledge of the properties of structural materials will greatly influence students in the works which they may design and construct.

Botany of Crop Plants, by Wilfred W. Robbins, Ph. D. P. Blakiston's Son & Co., Philadelphia. Price, \$2.

This is intended as both text and reference book. Its compilation has grown out of a course of instruction extending over a number of years. Mr. Robbins is professor of botany at the Colorado Agricultural College and much of his material has been used in college freshman classes as a text from which to make assignments and as a guide and reference in the laboratory. The book is intended to give a knowledge of the botany of the common orchard, garden and field crops. In its preparation the writer had in mind non-agricultural as well as agricultural schools, because of the growing tendency to tie up botany more closely with economic interests and to draw more upon economic plants in citing examples and in choosing subjects of study in the laboratory.

Clearing and Grubbing, by Galbert P. Gillette. Clark Book Company, New York City. Price \$2.50.

In this book, just from the press, will be found not only very much valuable information by an authority on a subject which has heretofore been treated, in a way, as somewhat beneath the consideration of engineers, but also a compilation of all the important facts from state and government and current periodical publications on clearing and grubbing operations. It is the only book of its kind in print. A slight conception of the importance of the subject may be had when it is remembered that of the 400,000,000 acres of farm land now under cultivation, it is conservatively esti-

mated that 50 per cent. had to be cleared and stumped before it could be cropped; and, assuming that the 200,000,000 acres of farm land in America have been cleared and grubbed at an average cost of only \$10 an acre, the great economic necessity of the application of the most modern and practical methods in clearing operations will be readily seen. Mr. Gillette has met this need in his book, and has clearly and thoroughly covered the various methods and machinery employed, and embodied where ever possible most valuable cost figures, which his actual experience as an engineering contractor have made familiar to him. The merit of the book, and its value, are unquestioned.

Successful Canning and Preserving, by Ola Powell. Lippincott's Home Manuals. J. B. Lippincott Company, Philadelphia. Price, \$2.00.

Of the new literature on the preservation of food products, none is more important than Miss Ola Powell's "Successful Canning and Preserving." Miss Powell is assistant in Home Demonstration work in the States Relations Service of the United States Department of Agriculture. In this service her skill has gained national recognition and she is regarded as one of America's foremost experts on canning and preserving meat, vegetables, and fruits. Her experience and research enable her to speak with authority and entitle her new book to a place among the classics of this branch of literature.

"Successful Canning and Preserving" has two functions in that it is suitable for use as a text book and for practical application to household needs. Miss Powell's work in the States Relations service has rendered her admirably fitted for giving full value to both of these important phases. For several years she has directed the government canning clubs in which thousands of women and girls have acquired complete training and achieved practical and concrete results. In her book she details the methods by which the finest quality of canned products have been prepared by home canners of fourteen and older. Individual examples are given of the success of the work of canning club members. One such instance shows a season's marketing record of \$155.86 in profit for a girl in one of these clubs. As a family record is cited the experience of a household which during the season put up 6,500 cans and glasses of vegetables, jellies and jams of a value of \$772.80. The total cost was \$193.20, showing a profit of \$579.60.

While dealing primarily with canning and preserving the book devotes 25 pages to drying vegetables, fruits and herbs. The subjects discussed in detail

include: canning in tin, canning in glass, fruit juices, preserves, marmalades, jams and conserves, jelly making, pickling, the preservation of meats, the use of vegetables and fruits in the diet, the organization of canning clubs and the business side of home canning. No person who follows the book carefully can fail to meet with success in these various activities.

To increase its value as a text book the volume devotes considerable space to the subject of teaching canning and kindred studies. This is so explicit as to make the book an important addition to the course of high schools, normal schools and other institutions. Another feature of similar worth is a carefully prepared list of questions at the end of each chapter, from the point of view of a home economics teacher.

The book contains 372 pages, four colored plates and 164 illustrations.

Chemistry of Food and Nutrition, by Henry C. Sherman, Ph.D., Professor of Food Chemistry in Columbia University. The MacMillan Company, New York. Price \$1.50.

For its purpose this book has the presentation of the chemistry and nutritive value of food in relation to the requirements of the human body. It is the outgrowth of years of experience in research work and in teaching the subject to collegiate and technical students. It is especially useful to the general reader who realizes the importance of nutrition as a factor in general health. It also embodies material that should be of value to teachers and students. The plan of the work includes brief description of the principal foodstuffs and the agencies and processes through which they become available for the uses of the body. In addition it follows the functions of these foods in the tissues and sets forth the food requirements of the body under varying conditions, the nutritive functions of chemical elements and the quantities in which they should be supplied by the food. It also details the standards by which to judge nutritive value and economy of articles of food.

Feeding the Family, by Mary Swartz Rose, Ph.D., assistant professor, department of Nutrition, Teachers' College, Columbia University. The MacMillan Company, New York. Price, \$2.

Intended primarily for uses in the home, this volume undertakes to present food and diet information in such manner as will make it easily available in the midst of the cares of the household. The subject is treated clearly and concisely, in plain language, showing how the science of nutrition may be applied in daily living. The author treats of the

food needs of the individual members of the average family, from infancy to old age. Various concrete illustrations of food plans and dietaries are presented, and generous heed given to the housewife's problem in reconciling the needs of different ages and tastes. Among the problems helpfully treated are the construction of daily bills of fare on a rational basis, the wise expenditure of money for food and reasonable control of the kinds of food consumed.

The book has a value for every housekeeper.

Human Foods and their Nutritive Value, by Harry Snyder, B.S., Professor of Agricultural Chemistry in the University of Minnesota. The MacMillan Company, New York. Price \$1.25.

Professor Snyder, in this book, shows a clear understanding of food values and sets them forth in style well adapted for use of the work of a text-book for students in colleges. In concise form he presents the composition and physical properties of foods and discusses some of the main factors which affect their nutritive value. Combined with a presentation of the principles of human nutrition is given a study of the more common articles of food, in the belief that it will suggest ways in which foods may be selected and utilized with saving of money and increased efficiency of physical and mental effort. Especial prominence is given flour, bread, cereals, vegetables, meats, milk, dairy products and fruits as the articles most extensively used.

The *Handbook of Explosives*, just issued by E. I. Du Pont de Nemours & Company, gives instructions for the use of explosives for clearing land, planting and cultivating trees, draining, ditching, subsoiling and other purposes. Especial interest attaches to the information in connection with tree planting. The book shows that blasting mellows the ground to a depth of five or six feet and throughout a circular area 10 to 20 feet in diameter, making it easy to dig the hole and plant the tree correctly. In addition it creates a porous, water-absorbing condition which decreases the danger of drouth and invigorates growth. Details of processes of tree felling and stump blasting are also given. The book is filled with information on these and related subjects and is useful to all who are interested.

"Vertical Farming" is another book issued by the same concern. This deals with the use of explosives in shattering subsoils, to give greater feeding area for the roots of vegetation. This book is by Gilbert Ellis Bailey, A. M., E. M., Ph. D., professor of geology at the University of Southern California. It is freely illustrated.

CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY, CANADIAN SOCIETY OF
FOREST ENGINEERS

The next step in forestry progress in Canada will probably be toward the better disposal of logging debris. With the advent of co-operative fire protective associations and the consequent great improvement in the forest fire situation and the greater knowledge of the causes of fires and the means for their prevention, it is being realized that could we economically and practically do away with the slash from logging operations, one of the most serious of the remaining causes of forest fires would be eliminated. A fire once started in a logging slash is practically impossible to extinguish until it reaches an unlogged section or some other barrier. The uncut forest, except in exceptionally dry seasons, does not catch fire readily and the fire, if discovered soon enough, is comparatively easy to put out. In looking over a map of the St. Maurice Valley showing the burnt areas, one sees right away that nearly all the fires have followed logging operations, showing that the debris is a great menace. Lopping the tops in our spruce and balsam operations has been proved by actual experiment to cost practically as much as brush burning, and it is only a half-way measure. Where the tops are lopped they rot sooner, but for the first year or two are almost as dangerous as unlopped tops, and fires originating in such areas are almost as difficult to extinguish. Burning the debris is perfectly feasible, even with several feet of snow on the ground, and is very easy in soft wood operations. For two winters, the Forestry Department of the Laurentide Company has been cutting hardwood and all of the debris has been burnt without difficulty. The claim that the additional cost is too great might possibly be true if only one operator burnt his brush, but if such disposal were made compulsory by law, all operators would be on the same footing, and it would be no hardship. The claim that has often been made that it is cheaper to spend more for fire protection, instead of burning brush, is plausible but fallacious. Even by putting on many more rangers, it is very difficult to keep fires out of slash, and once started, the remaining timber is almost certain to be ruined before the fire is put out. Our dependence for the future is entirely on the uncut forest and the cut-over areas, on which trees below a certain diameter limit and the young growth are left and these must be thoroughly protected. The whole subject is being carefully studied and as fast as the owners of timber lands can be brought to see the necessity of absolute fire protection some practicable law will be formulated.

It is interesting to note the increase in the price of pulpwood lands, as shown by

the recent sale of timber limits in Quebec. Eight hundred and eighty square miles were sold at an average price of \$140 per mile, which exceeds by \$100 the largest average price previously paid. The highest price paid was \$1,000 per square mile. Quite a portion of the land offered for sale was withdrawn as the minimum price was not bid. A new condition is added to the leases, "The grantees of the aforesaid territory must within a delay of three years, manufacture annually in the Province of Quebec, with the timber cut in this territory, either pulp or paper, the proportion of ten tons per day, or sawn timber in the proportion of 10,000 feet board measure a day, per hundred square miles.

Some interesting efforts are being made in Ontario to reforest sandy hills in that Province. Five thousand, four hundred trees were planted, half the area being covered afterward with cedar brush. The section so covered showed the best results, the uncovered portion had many trees either covered with the drifting sand or blown completely out by the wind.

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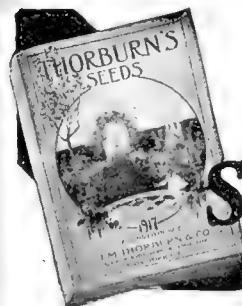
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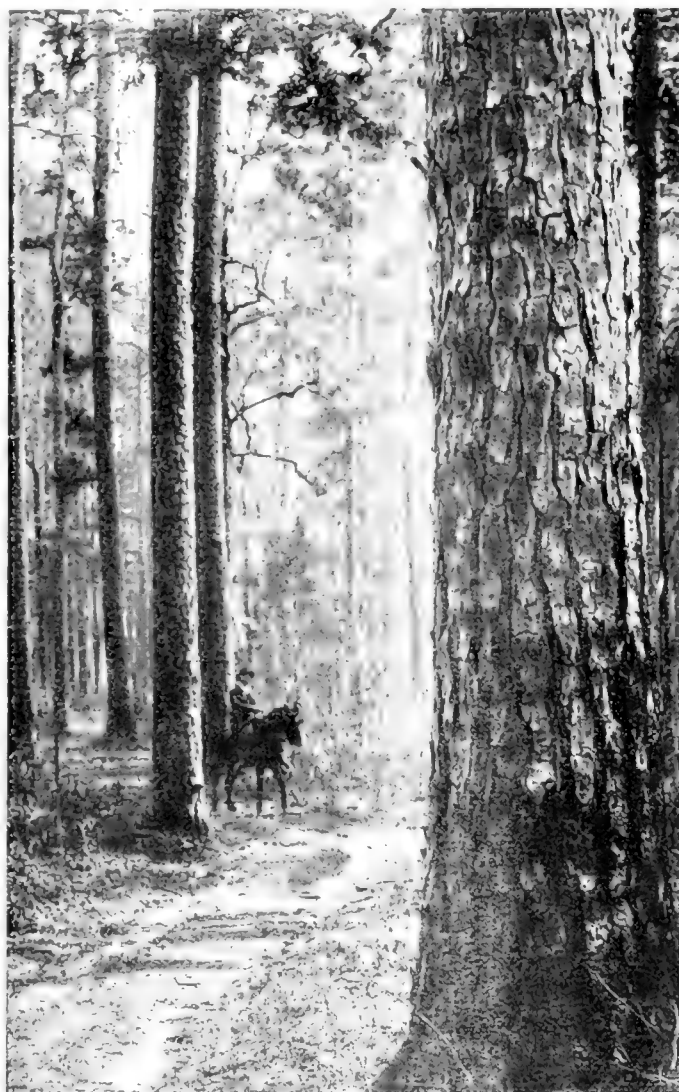
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- H. E. Zimmerman, p. 624; The thrushes, by A. A. Allen, p. 625-28; How we stand for efficient state forestry, p. 629; Building an atmosphere of stability into the home, by R. W. Haddon, p. 630-32.
- Arborea, May, 1917.—Legal problems of the tree warden, by Daniel G. Lacy, p. 220-7; Shade tree diseases, p. 227-8; Relation of parasite work to gipsy moth field work, by A. F. Burgess, p. 229-30.
- Arborea, Sept. 1917.—Solid stream spraying, by L. H. Worthley, p. 238-41; Forest tree planting, by G. E. Clement, p. 242-4.
- California forestry, Sept. 1917.—The University of California forestry summer camp, by Woodbridge Metcalf, p. 33-4; Brush in the forest nurse crop, p. 35, 37; Relation between effort and results in public service, by Roy Headley, p. 36, 39, 40; Chestnut bark disease, by E. P. Meinecke, p. 37; The new Yosemite, by Stephen T. Mather, p. 38-9.
- Canadian forestry journal, Sept. 1917.—Establishing a plantation of conifers on the prairies, by A. Loughheed, p. 1281-2; Four-thousand-year-old Sequoias, by Ernest G. Dudley, p. 1283-4; The waste of hemlock bark in B. C., by J. H. Hamilton, p. 1285-7; What the woodlot means to the farm, by Roland D. Craig, p. 1292-3; Natural forest in contrast to woodlot, by E. J. Zavitz, p. 1293-4; The uses of wood pulp, by John S. Bates, p. 1296-8; What slash disposal means, p. 1302; Timber resources of northern Manitoba, by J. A. Campbell, p. 1305-6.
- Indian forest records, 1917.—Note on the eucalyptus oil industry in the Nilgiris, by Puran Singh, p. 1-26; Note on the distillation of geranium oil in the Nilgiris, by Puran Singh, p. 27-32; Manufacture of wintergreen oil in India, by Puran Singh, p. 33-9.
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- Ohio forester, July, 1917.—Fuel and the woodlot, by Edmund Secrest, p. 27-9; The black locust, *Robinia pseudacacia*, by J. J. Crumley, p. 30-4.
- Schweizerische zeitschrift fur forstwesen, July-Aug., 1917.—Die wirtschaftliche zerlegung einer betriebsklasse in abteilungen, p. 189-94.
- Yale forest school news, Oct. 1917.—The open road to China, by Wm. Forsythe Sherfese, p. 51-2; The value of a technical education to a forest supervisor by Elers Koch and others, p. 52-6.

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IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

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National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the States, especially in forest fire protection.

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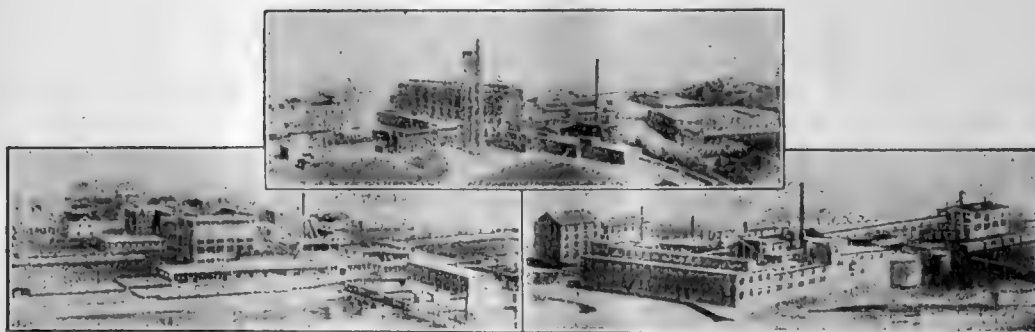
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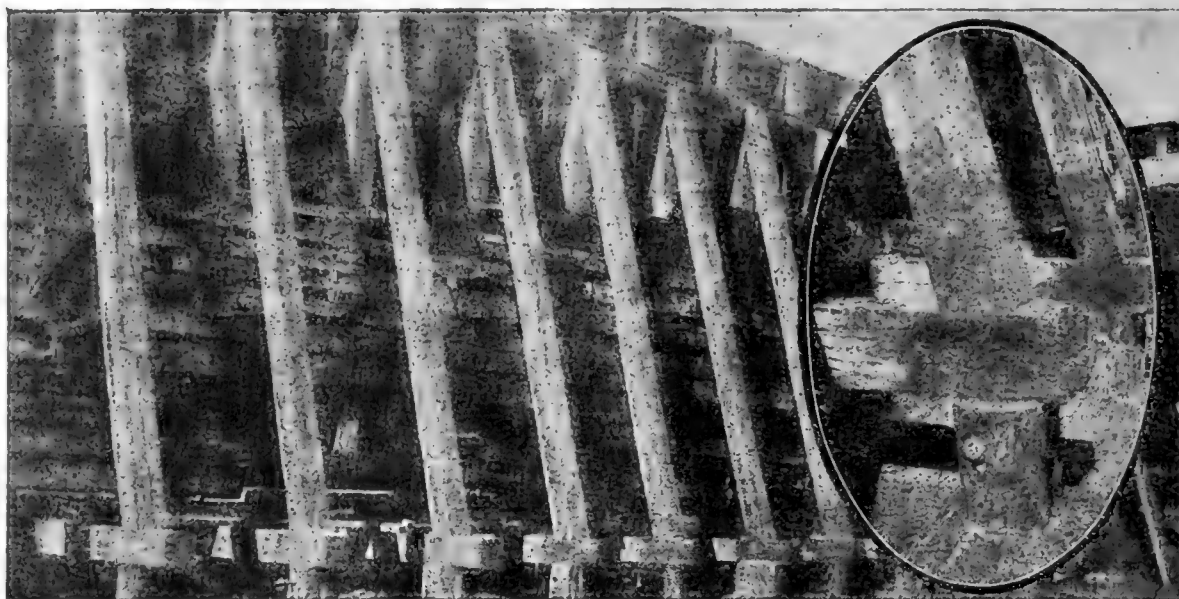
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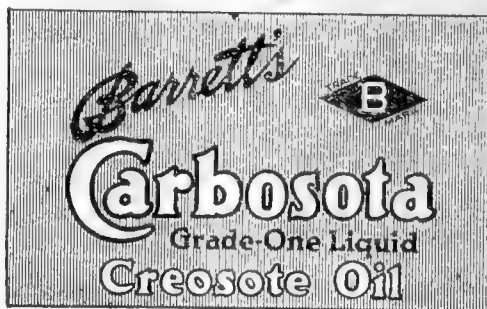
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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

DECEMBER 1917 VOL. 23

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Photograph by Courtesy of Bulang Arthur Johnson

HEMLOCK AND BALSAM FOREST IN BRITISH COLUMBIA

This is a scene behind the felling crews. It is an unusual picture because of its clearness and the perspective. Red cedar is usually associated with the other timber in these forests, and the standard types of cut are 75,000 to 100,000 ft. square. Western hemlock is now being used extensively for pulpwood. It also makes excellent lumber, being much superior to eastern hemlock. The next step in the logging scene above is to skid the logs by cable to the head of the log road. The portable donkey engines in the woods are known as "skidders," the one at the foot of the log road is the "roader" or "bull donkey."

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Members of the American Forestry Association and others interested in forestry are asked to contribute to the fund now being raised to provide comforts and any necessary relief to the members of the Forest Regiments called for service in France.

These men, there are some 10,000 of them, have the task of supplying for the army of the Allies such absolute necessities as cordwood for cooking and heating, posts for trenches and mines, planks to haul heavy ordnance over, boards for hospitals and billets; ties for railroads, timber for temporary bridges and many other emergency uses. At least 25,000,000 board feet will be needed monthly. This will be obtained from the French forests, the only source available at present, due to lack of water transportation. These forests the French have generously agreed to sacrifice, but desire them cut, as far as it is possible, along forestry lines.

A joint committee has been formed of the lumbermen and forestry organizations of all kinds throughout the country, which will solicit funds and take charge of all sums raised for the comfort and relief of the men in these regiments. All such funds are to be expended to meet the special needs of the men in this special industry. Immediate needs are along the lines of comfort and recreation essential to physical and moral welfare, and later serious relief for soldiers and dependents will be pressing. To meet this larger and more vital demand members of the American Forestry Association are asked to contribute generously. Reports of the use made of contributions will be published from time to time in all of the lumber and forestry journals.

We confidently ask you to stand behind the men of the Forest Regiments who furnish the lumber which, next to ammunition and food, is the greatest need of the Allied army. The personnel of the committee will assure that every cent subscribed will be utilized to the full in assistance and relief. All funds are to be sent to Mr. P. S. Ridsdale, secretary of the American Forestry Association at 1410 H Street, N. W., Washington, D. C., which Association has offered to give its office accommodations and the time of its secretary, free, to the administration of the relief work.

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AMERICAN FORESTRY

VOL. XXIII

DECEMBER 1917

NO. 288

YE HOLLYE GREENE

DONALD A. FRASER

Ye hollye greene is Christis tree,
Yt groweth cleane and springeth free,
And all yts beauties reach their prime
To grace His blest Nativitie.

Yts stately stem stands straight and still,
As stood His roode on Calvarye's hill,
And, Lo! how slow yts growth, and sure,
Just like His Kingdome 'gainst ye ill.

Ye thornes that pierced His brow in griefe
Are set around each gleaming leafe,
And chalices of precious bloode
Are glowing in each berrye sheafe.

When nature's moping cheerlessly,
Ye hollye shineth faire to see;
Remember, Christians, be not sad,
Ye hollye greene is Christis tree.

A FORESTER AT THE FIGHTING FRONT

BY P. L. BUTTRICK

YOU have seen in winter bare New England or western hillsides from which all the timber has been cut, except a few struggling, undersized trees and

a few old snags and over which a fire has swept, burning up the slash and blackening the snags and remaining trees. Over this a light snow has fallen, not heavy enough to form a complete mantle, but sufficient to cover most of the surface. Roughly following the contour of the hill and here and there running up and down across them are little ribbons, which stand out somewhat; skid roads, roughly hollowed trails made in getting the timber down the slope.

Such too familiar scene of desolation greeted my eyes when I first came out in the open from a young pine forest and looked out across a valley into a section of reclaimed but devastated France. The resemblance of the desolated country about

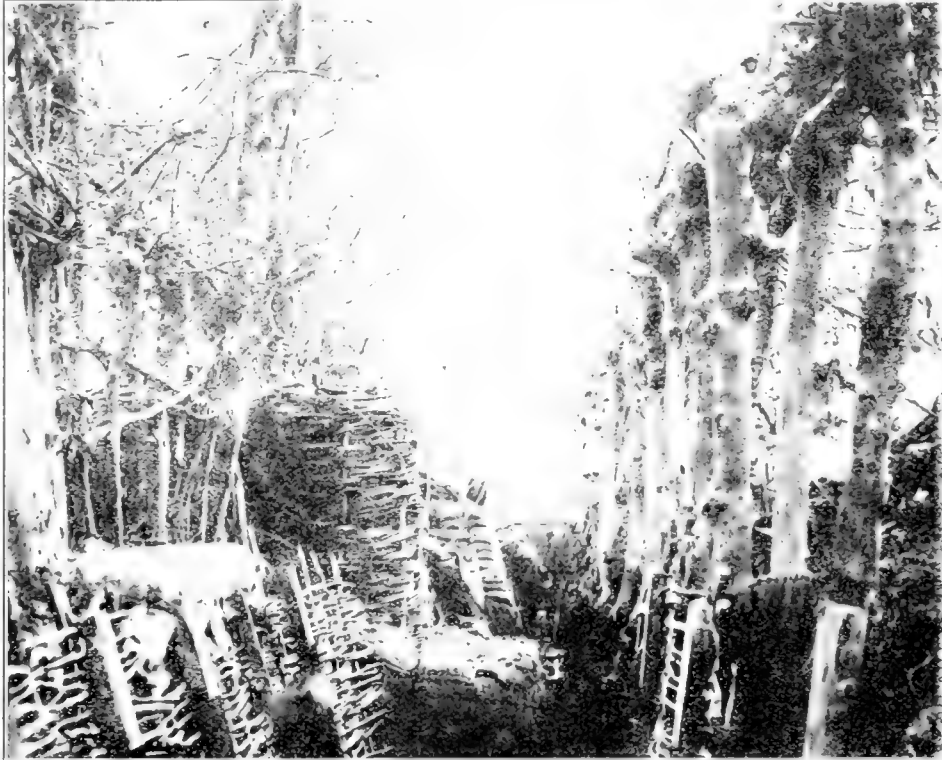
French and German trenches and in "No Man's Land" between was so striking that when a French "75" "went off" concealed nearby, the report subconsciously interpreted it-

self to my mind as a dynamite charge set off by the stump-blasting crew working on a new cutting.

The boom of the exploding shell and the column of dust spurting into the air in Boche land across the forbidden zone even more easily became in imagination a fallen pine raising a snow cloud as its spreading branches hit the ground.

After the Battle of the Marne the German retreat between Rheims and Verdun stopped at one place just outside a little village called Prones. This village is about half way up the western slope of a small valley.

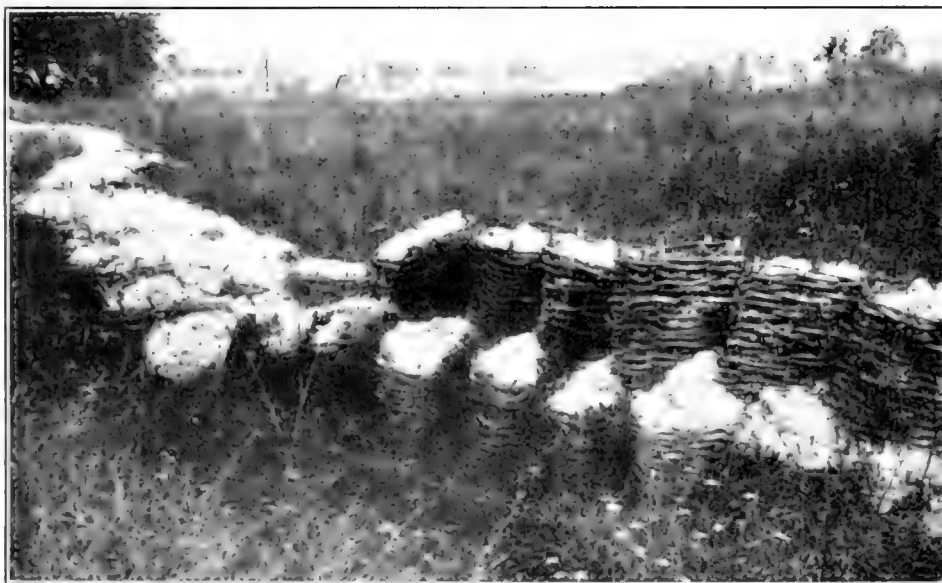
The French first line of trenches were just below the village and the German's a little lower down in the valley. The valley on both sides was covered with a



Photograph Underwood & Underwood, New York.

WELL HIDDEN TRENCH IN THE BRITISH LINES

It is safe to assume that the German forces would have difficulty in locating a trench as well concealed as the one here pictured. The timbers still carry spreading boughs and these give an effect that would make the real purpose of the trench hard to detect at a distance, whether viewed from an airplane or from the ground. The picture was taken as an official war photograph.



Photograph by P. L. Buttrick

WOOD IS USED EVERYWHERE

It is not merely in regular trench work that the product of the forest is utilized in building trench defenses. This picture shows reserve trench built up with baskets of pine boughs filled with sod. Such defenses are frequent.



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WHERE FORESTERS AND WOODSMEN ARE IMPORTANT IN MODERN WARFARE

This scene near Zillebeke is taken from an official British photograph. It shows British soldiers at work cutting down trees for the purpose of procuring timbers to be used in road-making and in strengthening dug-outs. The picture was taken during the Flanders drive and shows a type of activity that is carried on all over the war zone.

thick growth of sapling pine, some planted, some natural growth. For over two years little change took place and the trees continued to grow unmolested. In the spring of

1917, however, the French determined to advance their lines. Accordingly, artillery was massed in the woods back of the village. At a given time the French opened



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A FRENCH BATTERY RETURNING FROM THE FIRING LINE

In this peaceful forest scene the only suggestion of war is a'orded by tle long line of soldiers. These men are returning through the woods, on their way to the rear, after a long siege of shelling the lines of the enemy. The pictorial effect is that of a woodland spot in the vicinity of any American city—but the thrill of war is there, none the less.

a barrage fire which practically leveled the German trenches and obliterated the woods on the hillside. The very earth was turned upside down on parts of the terrain. Over this man-made desert the French infantry advanced and occupied the German trenches way to the top of the opposite hill.

The white appearance of the hillside, so much resembling light snow, is due to the chalky, limestone character of the rock and soil. The lines so closely resembling skid roads were of course the trench lines.

The writer would have liked the opportunity of studying more closely the



Photograph Underwood & Underwood, New York.

HOW THE INVADERS TREAT FRUIT TREES

In their retreat along the Aisne the Germans left the mark of their ruthlessness on the entire countryside. The fruit tree here shown is typical of the destruction wrought. The picture is from a French official photograph.

effect of modern, intense, artillery fire on soil and tree growth. While he might have done so for a short time no censor would have had to trouble himself to read any manuscript of the investigation.

From what could be seen, however, modern artillery fire can produce a degree of destructiveness to soil and forests far in excess of that ever done in the most destructive lumber operations, even when followed by forest fire. It is said that the devastation in this section is as nothing to that in some places in Flanders. One can conceive, of course, of more complete destruction than



Photograph Underwood & Underwood, New York.

THE HAVOC OF WAR AS TOLD IN DESTRUCTION OF FORESTS

Determined to harass the enemy in every possible way, the German forces destroy forests as well as cities and farm crops. Manifestations of this spirit of ruthlessness, such as pictured above, mark the entire line of retreat of the Teutons. This picture shows the growth of years destroyed with a few strokes of the ax.

that which I saw, but even here the productive capacity of the soil for forest growth, to say nothing of agriculture, has been almost irreparably impaired.

While the trenches may be filled up in the valley and the fields restored, their immediate value will be slight. Sub-soil ploughing has its advantages, but no one would consider land over which a gold dredge had operated to be desirable farm property, and much of the valley land resembles western land so treated.

It will take careful study and experimentations to discover the tree-growing capacity of the hillsides—studies not easily made under shell fire.

shells into these woods from time to time, "fishing" for these concealed batteries. The effect is that of a heavy ice storm combined with a moderately high wind—broken branches, shattered tops, occasional trees uprooted or broken down.

A more complete study of this light shelling would have been interesting, particularly if an opportunity could have been afforded to compare the effect of shrapnel and high explosive shells, but wars are not conducted for the benefit of foresters, of foresters with an investigating turn of mind.

A visit to the trenches themselves showed some inter-



Photograph by International Film Service.

PHOTOGRAPH TAKEN DURING AN AVIATOR'S DEATH FALL

This remarkable photograph was found in a camera picked up near the wreck of a flying machine in which an aviator had just fallen to his death, after a shot from a German air raider. It is assumed that the camera had been fixed for exposure and that when the stricken machine dropped the picture was taken automatically. It is believed that the scene pictured is that of an exploding shell, as no other theory explains the cloud of smoke and dust at the left. This mute evidence of the camera bestirs a picture of the thrill of war as experienced by the man who braves the perils of the air in a winged ship. When an airplane is successfully attacked by an enemy plane the aviator knows no escape. With his machine wrecked his plunge to death is inevitable. In this forest scene is given a suggestion of the type of woodland in which American Forest Regiments are at work. The bleakness of the landscape is in keeping with the general appearance of the forests in the war zone, but there is good timber available in the standing trunks.

The German fire was either directed largely against the French infantry advance or was not especially heavy, judged by barrage standards.

The writer had the opportunity of visiting some of the French batteries concealed in the woods back of the lines. The timber was a rather dense stand, some thirty years old, I should suppose. The Germans had dropped

esting uses of wood products. Most of the dugouts resemble in their construction vegetable cellars and powder magazines of our northern lumber camps, being built of small logs and poles banked with earth. The stiff soil of the region holds up well and the trenches require little shoring up.

When it is required the French use large numbers of

gabions or rough baskets of woven pine branches and filled with earth, this being one of the first uses the writer has ever seen for pine twigs.

A walk through some of the captured German trenches seemed to show that they preferred concrete for the purpose of shoring up, as it is hard to believe that they expected the rather thin layer of concrete and a lean mixture at that to withstand artillery fire.

If they did the Kaiser must have profusely "strafed" the engineer who planned the work, for the French fire knocked it into fragments or overthrew considerable sections in good sized sheets. One might hazard the guess that the French basket work would be a safer bulwark and more enduring than the German concrete.

Behind the trenches much use is, of course, found for wood of all sorts and sizes, some novel uses as well as many old stand-bys. The corduroy road of Civil War times and logging camp stories is in evidence, as A. R. C. ambulance drivers are prepared to testify.

Rough log and board shacks have sprung up all over the war zone for use as store houses, barracks, hospitals and the like. Many of the board shacks are made of poplar boards sawed from Lombardy Poplars which lined so many of the French highways.

Another interesting but dissimilar use of wood products is the making of fake plantations along

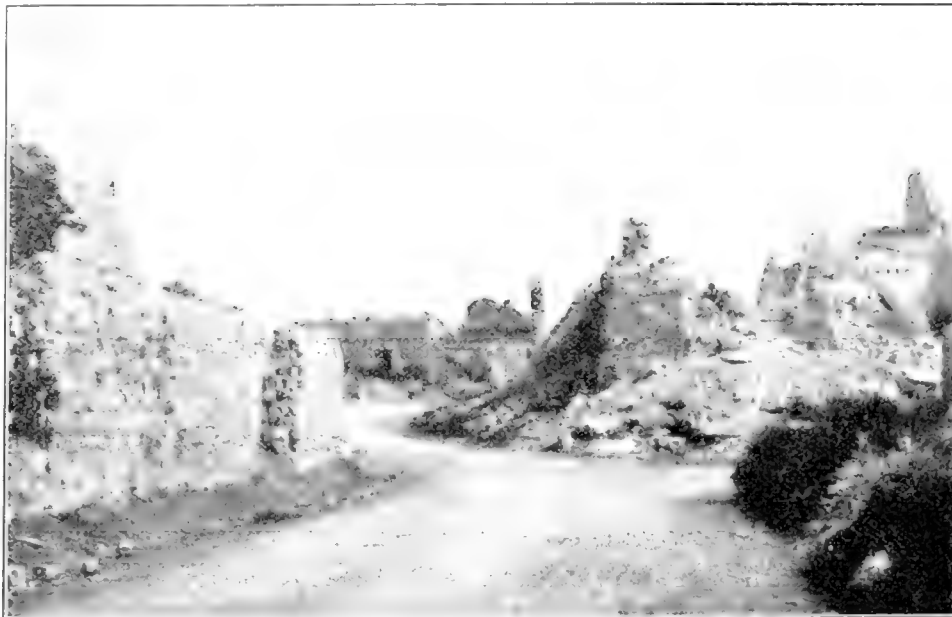
roadsides to screen troop and supply movements from the enemy. At first, apparently, large numbers of young pines were cut down and set up alongside the roads. Later this gave place to the hanging of pine branches on wire and frames supported by poles. Straw, grass and burlap are used in the same fashion. How successful this form of camouflage is can be realized only when

one sees a road from a high observation tower through a telescope or from an airplane.

From very ancient times the military man has recognized the value of forests for concealment from and deception of the enemy. The American Indian understood this perfectly and used it most successfully, but his descendants serving

with the American Expeditionary Forces may learn much from the French.

Not the least interesting feature of my first day at the front was the discovery of the many and varied activities of a modern army and the actual army itself, hidden away in a dense young pine forest. Naturally, little or nothing can be told about this, but much was strangely reminiscent of logging camps "back home"—log huts, blacksmith shops, stables, teams, narrow gauge railroads, even felling operations, for military purposes, of course. An occasional Soixante Quinze, not to mention guns of larger calibre, might seem to supply a somewhat discordant note to any logging camp, but when a gun appears to be merely a pair of wheels



Photograph by P. L. Buttrick.

ONE OF FRANCE'S RUINED VILLAGES

This was one of the stopping places in the German retreat after the battle of the Marne. The enemy occupied a position near the village until the spring of 1917, when driven out by French barrage fire. The destruction is complete.



Photograph Underwood & Underwood, New York.

SOLE SURVIVOR OF AN ITALIAN BOMBARDMENT

Giving an effect much like an eagle with spreading wings, this remnant of a tree is the only thing left even partially intact on the entire mountain side of Mount Santo, which was taken by the Italians. The picture was taken by the Italian government.



Photograph by P. L. Buttrick.

HOW WOOD HELPS TO WIN

In trench building timbers are indispensable. This shows the use of wood in throwing up trenches in the French war zone. The Engineer regiments of American foresters and woodsmen will supply materials for this purpose, among others.



Photograph by P. L. Buttrick.

ROAD CAMOUFLAGE IN FRANCE

Suggesting some of the methods applied for the purpose of misleading the enemy and preventing him from knowing too much of what is being done. This shows a screen covered with pine boughs in the Champagne region.

from a logging wagon upon which has fallen a small log, one takes it quite for granted.

Lumber jacks dressed uniformly in horizon blue and wearing fatigue caps or steel helmets, might look like a

strange setting in front of a bunk house, but after a few weeks of familiarity with men in such garb, which in active use soon takes on a work-a-day appearance, one takes them as quite a part of the scheme of things. In



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HOW WOOD AND WIRE HAMPER THE FIGHTERS

This mass of entanglements is directly in front of that line of trenches known as the Hindenburg line. This line was supposed to be impregnable and the Germans had built trenches there, as showing that they intended to stay at the place for a long time. The British soldiers of the western front cut through the entanglements and drove the enemy from his position. The picture shows the results of the cutting through.

fact, the whole thing seems very work-a-day and non-military, but then the present business of mankind is war, and this is a very work-a-day war.

Regarding Belgium a dispatch from Paris says: "It will be a treeless Belgium to which the people of that unfortunate country will return, if its invaders are not driven out before they have completed their work of devastation. Factories have been despoiled of their machinery, every form of property has been requisitioned, and now woods, forests and even individual trees are being cut down wholesale. The wooded heights of the Belgian Ardennes, which used to protect the center of the country from east winds, are rapidly being denuded, the tall elms that lined the high roads and canals have been felled, and walnut trees that adorned the gardens of the well-to-do in Brussels have not been spared.

"In the early days of the occupation, the Belgian State Forest Department was allowed to supervise the work of

felling and see that it was scientifically conducted, but after a few months, the Germans took over the direction of the department and observed only one rule—to obtain the greatest amount of wood for military purposes in the shortest possible time.

"The Belgian government has been able to learn details of the work done, such as that 1,000 acres have been cleared in the Hertogenwald (Liege) and felling continues there, the fir plantation, 'Fays de Lucy,' the finest in the country, has been completely razed, and the magnificent forest of Soignes, south of Brussels, is rapidly disappearing. These are only examples of dozens of similar cases which are known, and to this devastation must be added the consumption of wood by the native population which for three years has been unable to import any and has had to use quantities instead of coal.

"Serious consequences from every point of view, health, climate and hydrographic, are expected from this widespread destruction of woods and forests, if it continues another year or two."

HOW WARFARE TAXES THE FORESTS

ONE of the big developments of the war is the extent to which it has educated American lumbermen to think in mighty figures without visible signs of excitement. Two or three years ago a buyer for a hundred million feet of lumber would have thrown the industry into a fever and delivery would have been a matter of long negotiation and discussion. Today the lumber trade deals in billions of feet and orders are filled overnight.

Forest products enter into modern warfare on a tremendous scale. Practically everything an army does calls for wood in one form or another. From encampment construction to trench building and from munitions to flying machines the forest is an indispensable source of supply and the woodsman an essential ally. Wooden ships and wood alcohol, paper shirts and cellulose, chloroform and surgical dressings; all these and countless other articles necessary to successful warfare depend on the forest for their origin.

Of the hundreds of millions of feet of lumber required for the building of the encampments for national army and national guard the story has already been told. To this must be added in a vast aggregate the materials used in aviation camps, supply depots and the other forms of construction required in preparing the United States armed forces for their battle to make the world safe, and the other hundreds of millions of feet used in the building of ships for the emergency fleet. All this material has been produced and delivered in a space of time amazingly short and the current demands are steadily receiving the same priority of attention at the hands of lumber manufacturers and transportation companies.

With a lumber industry already keyed up to high pitch of efficient production the present month brought the announcement of a new source of demand for lumber for

army uses. This involved the supply of three hundred million feet of southern pine for the erection of portable knock-down houses for the use of American troops in France as barracks and hospitals. This undertaking of itself contemplates immediate lumber requirements half as great as those of the encampment construction and adds new pressure to the demands on the industry.

The plans of the War Department architects provide for houses to be made up in panels, shipped across the sea in knocked down condition and bolted together by the soldiers in France. Co-operation between government and manufacturer was exemplified by important changes in specifications after a conference of the lumber interests with representatives of the War Department. The original plans called for the manufacture of the panels by the lumbermen. By pointing out that this was a work with which they were unfamiliar the manufacturers convinced the government that it was better that they should confine their efforts to producing the required material. This will be done and the lumber delivered to contractors who will pursue the structural feature of the work.

The need for these houses arises from conditions similar to those which make it necessary for this country to send regiments of foresters and woodsmen to the French war zone. Labor for construction purposes is practically unobtainable in Europe. With the ready-made houses the soldiers may provide their own shelter. Every phase of the work will be in standard units which will make it possible for the men to erect quickly buildings ranging in size from the one-room shelter house to a hospital accommodating hundreds of patients or barracks for thousands of soldiers.

The speed with which this new requirement for material will be met will be in keeping with the record established in providing lumber for the army camps

The rapidity with which the camps were constructed is almost beyond belief. At Fort Sheridan, in preparation for the officers' training camp, 86 buildings were erected in 10 days. At Fort Oglethorpe 135 buildings were put up in 12 days. Without highly organized efficiency in the lumber and building industries these records would have been impossible.

This construction program, through sheer magnitude, appeals to the imagination and concentrates public gaze on this particular form of the demand now being met by the lumber industry. Less spectacular, perhaps, but of no less importance, is war's demand for forest products in other directions. Consider the case of the wooden packing box. With none of the romance attached to the magic cities that have sprung up for the army camps and lacking the glamor of building a thousand ships, the packing box is playing a vast part in the lumber requirements of wartime. The material used for making boxes for army and navy supplies has already run into hundreds of millions of board feet and the demand will continue as long as there are an army and navy to provide with supplies. Other huge quantities of packing cases are required for the packing and transmission of munitions and these likewise are consuming lumber in tremendous volume.

In the building of army transport wagons is another field for the use of lumber in large amounts. The vehicle of this type must be a model of strength and service and into its construction must enter the best grades of pine, oak and hickory. A good many thousand army transport wagons are now under construction and the demand from this source will last indefinitely.

When it comes to the actual instruments of warfare the products of the forest enter largely into the needs of an army. Without charcoal it would be impossible to make the black powder which is used in such quantities in explosives, especially shrapnel. Rosin is another item which has made itself indispensable. This product of the pine forests of the South is used by thousands of barrels in the making of shrapnel, for the purpose of holding the bullets in position in the explosive shell head. The manufacture of high propellant explosives requires great quantities of acetone and alcohol, both of which are products of wood distillation. From the refuse of pulp mills science procures muriatic acid, sulphuric acid and chloroform. Wood pulp itself has so many uses as to make them difficult to specify. During the war it has found its place in the manufacture of paper shirts, vests, socks and handkerchiefs, blankets, clothing padding and kindred uses. In Germany wood cellulose is extensively used instead of cotton in the manufacture of gun cotton. Wood pulp is even being utilized in considerable volume in the manufacture of a substitute for cotton for surgical purposes and in making tough paper for surgical dressings and paper board for splints.

In other words, an army depends on forest products from the time its men are mobilized in encampments until

the wounded have received the attention of the surgeon. The National Lumber Manufacturers' Association makes the statement that the first twelve months of America's participation in the war will probably see as much as three billion feet of lumber used for purposes of national defense. This is for construction purposes, and to these figures must be added the large quantities used for incidental requirements. The figures are startling but in spite of their size they represent less than seven per cent of the normal annual lumber production of the United States. In timber resources and manufacturing facilities the lumber industry can take care of all ordinary demands and supply the timber needed for war purposes.

The abnormal need for lumber will not end with the war. When peace shall have been established building material in tremendous volume will be needed for reconstruction of ravished Europe. Coincident with this will be the resumption of normal building operations in England which have been checked by the war. Already the British Government is considering housing plans to relieve the congestion now existing. It is figured that the country will need to erect from half a million to a million new houses within the first two years after the end of the war. Since 1906 there has been a steady decrease in the building of houses for working men. With the outbreak of the war there was practically complete cessation of even the diminished activities in this line, excepting in munition manufacturing areas. To make up for the deficiency it is believed that the government will provide financial assistance for house building on a mammoth scale.

One phase of the patriotism of the lumber interests was manifested in a campaign recently conducted throughout the South by speakers organized by the Southern Pine Association. To stimulate the woodsmen to the expenditure of their best effort in speeding up the production of timbers for the Emergency Fleet these speakers canvassed the entire southern lumber area and spoke before workers at sawmills and logging camps. The appeal to the men was based on the vital need of America for wooden ships and the importance of supplying structural material as quickly as possible. A poster displayed throughout the lumber regions said: "Every swing of an ax, every cut of a saw, may score as heavily as a shot fired from the trenches. Help our boys in France. Help them win the war." As a result of the speeding-up campaign it was expected to increase the output of ship timbers from 850,000 feet a day to 2,000,000 feet.

MISS Grace Pickens is taking the course of forestry at the University of the State of Washington. She entered at the opening of the current session. Other women have registered for selected forestry courses in the University, but Miss Pickens is the first to specialize in a work that has been considered a man's calling. She is from La Grande, Oregon, and has spent much of her life in the woods.

FORESTERS AND WOODSMEN IN WAR WORK

ALLIED leaders in Europe have given cordial welcome to the first contingents of American foresters and woodsmen to arrive in the war zone and take up service in the forests of France. The first arrival was the 10th Engineers (Forest), which went oversea in August. This regiment was followed in November by the first and second battalions of the 20th Engineers (Forest). By French and British war leaders these men are looked upon as a vital contribution on the part of the United States to the allied cause in the great conflict. The requirements of the fighting forces in the way of timbers for trench building and lumber for other forms of construction are such as make these trained workers indispensable to military success.

No figures are available as to the amount of timber which has gone into shoring up trenches and dug-outs, into the building of miles and miles of trench sidewalks and corduroy roads and into artillery and trench screens. Nor is it possible to estimate the quantity used in railroad and bridge construction and in the building of warehouses, barracks, hospitals and other structures. Experts agree that it totals many millions of feet along the hundreds of miles of front. From the statement of a French colonel it is learned that as high as thirty thousand trees have been used in a single day by one French army corps alone. This emphasizes the worth of the American Forest regiments, which will be charged not only with supplying timbers for military use but with producing the material along such lines as will best serve the purpose of perpetuating the French forests.

Along a part of the French front white fir will be the principal timber available for the use of the American regiments. This fir is described as of good quality and fairly good stand, resembling the balsam of the American northwest. It grows in a region of good roads and comparative ease of logging operations. In another section the timber is akin to Norway pine, but with smaller yield per acre. Elsewhere is found short leaf pine, somewhat

like Florida pine in size and yield. Operations in this timber will be conducted in swamps and sand. In some places the American forces will find such hardwoods as beech and oak, of growth smaller and thicker than the hardwood timber of the western Appalachians.

Mid-December found the third and fourth battalions of the 20th Engineers (Forest) completely recruited and organized for service in the war zone. No definite announcement is made as to the time of embarkation for France, but it is understood that in line with the general policy for the formation of the regiment the two new units will soon be at work in the French forests.

Each battalion of the 20th contains three companies of 250 enlisted men, a large proportion of whom are foresters, woodsmen and sawmill workers. When the ranks of the third and fourth battalions had been filled there was a considerable overflow of available men and these are being utilized in the formation of the fifth and sixth. It is probable that two battalions will go forward each month until the full strength of the regiment is completed. This will require ten battalions of the character of those already organized. To increase the efficiency of the trained workers in these battalions the regiment will also have nine service battalions, composed of laborers. The aggregate strength of the regiment will be close to 17,000 officers and men, making it the largest regiment in the world.

Col. W. A. Mitchell, U. S. A., is in command of the regiment and is in charge of the work of organization at American University campus in the District of Columbia. Colonel Mitchell has had broad experience which qualifies him admirably for the leadership of this force. His work has included road building in the Philippines, mapping at Fort Leavenworth and the designing and construction of dams in the Ohio river. He has served as instructor and assistant professor in military art and civil engineering at West Point. With the outbreak of the recent Mexican trouble he was sent to Arizona with a view to taking over Mexican railway operations if the

ONLY A VOLUNTEER

By a Private in the 20th Engineers (Forest).

WHY didn't I wait to be drafted
And led to the train by a band?
Or put in a claim for exemption?
Oh! Why did I hold up my hand?
Why didn't I wait for the banquet,
Why didn't I wait to be cheered?
For the draftee receives all the credit
While I only volunteered.

But nobody gave me a banquet,
And never a soul a kind word.
The puff of the engine, the grind of the wheels
Were all the goodbye that I heard.
Then off to the training camp hustled,
To be trained for a good half a year,
In the shuffle, abandoned, forgotten;
I was only a volunteer.

Perhaps some day in the future
When my little boy sits on my knee
And asks what I did in the world war,
As his big eyes look up to me,
I will have to look into those eyes
Which at me so trustfully peer,
And tell him that I wasn't DRAFTED
But was only a volunteer.



KIT INSPECTION AT CAMP OF THE FOREST REGIMENT

Some members of the 20th Engineers (Forest) at their camp at American University, District of Columbia. The picture shows how foresters, woodsmen and other civilians have been transformed into real soldiers in a short space of time. The officers are Captain C. B. Cutting and Second Lieutenant L. B. McDaniels. These men will soon see service in the War Zone.

occasion required. His selection as commander of the largest regiment affords opportunity for the exercise of his unusual executive ability and his skill in handling men and engineering problems.

Major James E. Long, Engineer Officers' Reserve Corps, has had the responsibility of purchasing equipment for the forest regiments. Major Long is a St. Louis man, with broad experience in the management of sawmill and logging operations. In his work on the staff of the chief of engineers his special training and knowledge have been of much value in preparing the forest forces for their work in France. One instance of the thoroughness of his work is the systematic method of making shipments for the regimental equipment. Each battalion is furnished with complete outfit for sawmill and logging operations. For sending these forward Major Long devised a plan through the operation of which every part and accessory is given a number and everything for one battalion is painted a distinctive color. This will make the work of assembling the equipment comparatively simple and will save much confusion.

Each battalion will be provided with four sawmill units. Two of these will be semi-portable, complete with edgers, trimmers, 100 horsepower boilers and other equipment, and will have daily capacity of 20,000 to 30,000 feet. Two of the units will be portable, with 60 horsepower boilers and with daily capacity of 10,000 to 18,000 feet. Each battalion will also have two 25-horsepower gasoline tie-cutting tractor units, for sawing ties in thin and scattering timber. Each of these units will have a capacity of 4,000 to 5,000 feet. In figuring capacity the ten-hour day is used. This will be materially increased, as each unit will have a portable electric light-

ing plant and operations will be conducted twenty-four hours a day.

After recent shifting the officers of the 20th are as follows:

Regimental Headquarters—Colonel W. A. Mitchell; Major Edwin H. Marks, Acting lieutenant colonel; Major William C. Moore, M. R. C., regimental surgeon; Captain H. L. Bowlby, adjutant; Captain P. E. Hinkley, regimental supply officer; First Lieutenant Cornelius W. Smith, chaplain.

Camp Headquarters—Major Benjamin F. Wade; Captain Edward H. Sargent, adjutant; First Lieutenant Gilbert C. Eastman; Second Lieutenant Richard L. Hyde.

First Battalion Headquarters Detachment—Major E. E. Hartwick; Captain Leon M. Pill, adjutant; Captain H. B. Campbell, engineer officer; First Lieutenant L. J. Freedman, supply officer.

Attached—Captain F. M. Bartelme, regimental engineer officer.

Company A, First Battalion—Captain, Arthur W. Elam; first lieutenants, Germain P. Graham, Duncan P. Shaw and James C. Williams; second lieutenants, John B. Cuno and Roy L. Chaffin.

Company B, First Battalion—Captain, Robert A. Cutting; first lieutenants, Harold C. Lyons, William A. Clark and Thomas W. Poindexter; second lieutenants, Arthur N. Dripps, Cecil B. Bradley and Angus I. Ward.

Company C, First Battalion—Captain, H. W. Boetzke; first lieutenants R. N. Benjamin, W. J. Wilson and J. Leroy Wood; second lieutenants Hollister Johnson and H. T. Hopkins.

First Battalion Medical Detachment—First lieutenants Robert B. Hill, M. D., Lloyd A. Elliott, M. R. C., and Charles P. Harrick, D. R. C.; second lieutenant, Julius A. Herbott, V. R. C.

Second Battalion Headquarters Detachment—Major Samuel O. Johnson; Captain Fred F. Spencer, adjutant; Captain Fred F. Horstkotte, engineer officer; First Lieutenant Mark R. Ethell, supply officer.

Company D, Second Battalion—Captain, John C. Perry; first lieutenants, William H. Crosson, Roy W. Pilling and Lawrence R. McCoy; second lieutenant, Myron H. Grover.

Company E, Second Battalion—Captain, W. D. Brookings; first lieutenants W. D. Volk, C. C. Kelley and F. R. Prince; second lieutenant, E. S. Brush.

Company F, Second Battalion—Captain, James C. Long, first lieutenants, Edwin D. Woodruff, Marion Nine and Walter O. Crosby; second lieutenant, Maurice L. Johnson.

Second Battalion Medical Detachment—Captain, J. H. Swafford, M. R. C.; first lieutenants, W. A. Fair, M. C., and R. H. Rowdybush, D. C.

Third Battalion Headquarters Detachment—Major, Arthur W. Corkins; Captain, Winthrop H. Estabrook, engineer officer; Captain Oliver J. Todd, adjutant; first lieutenant Charles M. Jenkins, supply officer.

Company A, Third Battalion—Captain, Collin E. Clark; first lieutenants, Harold M. Power, Jay H. Price and E. B. Hamilton; second lieutenants, Earl B. Birmingham and Albert L. Shellworth.

Company B, Third Battalion—Captain, Earle P. Dudley; first lieutenants, Herbert L. Holderman, Alexander H. Ellison and Morton Van Meter; second lieutenant, Fayette L. Thompson.

Company C, Third Battalion—Captain, George G. Steel; first lieutenants, Clement C. Abbott, Frederick B. Judge and Fred A. Stone; second lieutenant, Charles J. Davis.

Third Battalion Medical Detachment—Captain, Frederick C. Moor, M. R. C.; first lieutenants, Harold T. Antrim, M. R. C., and Edward S. Bracken, Jr., D. R. C.

Fourth Battalion Headquarters Detachment—Major George H. Kelly; Captain Winfield D. Starbird, engineer officer; Captain Edwin C. Wemple, adjutant; First Lieutenant Paul D. Mackie, supply officer.

Company D, Fourth Battalion—Captain, R. B. Carter; first lieutenants, W. G. Conklin, Ralph H. Faulkner and Alfred D. Kettenbach; second lieutenant, Fred A. Roemer.

Company E, Fourth Battalion—Captain, Andrew J. Fisk; first lieutenants, Lester W. Jacobs, Henry F. Power and Frank Mizell; second lieutenants, Luther B. McDaniel and W. A. Foster.

Company F, Fourth Battalion—Captain, Stephen C. Phipps; first lieutenants, William G. Howe, John Summerset and Milton Pittman; second lieutenant, Harry H. Miller.

Fourth Battalion Medical Detachment—First Lieutenants Leroy A. Schall, M. R. C.; Joseph C. Kimball, M. R. C., and John W. Snyder, D. R. C.

Discussing the men of the United States Forest Service who have gone into the Forest Regiments and other branches of the armed forces, Assistant Forester William

L. Hall declares that no other class of men in civil life, perhaps, was more nearly ready for military service than were the foresters and the men employed in state and federal field work. "These men had the preparation which came from years of field experience," says Mr. Hall. "They had all manner of problems to deal with and every kind of emergency to meet. They had been subject to shifts on short notice, with new assignments involving difficult problems and unknown conditions. Above all, they had the spirit of service and esprit de corps. They were fit, ready and anxious to do their part. All arms of the military service have absorbed men from the Forest Service. Our records show 214 men now in the army or navy, and the records are probably not complete.

"The Forest Regiments offered unusual opportunities which Forest Service men and others were keen to accept. More were qualified than could be commissioned. In the organization of the 20th the War Department appears to have reached the conclusion that the qualifications called for are principally experience in sawmill work and logging. If this decision holds, there will be only limited opportunity for foresters in the later battalions. But foresters and men of thorough Forest Service training are equally well prepared for other branches of the military service. Especially are they qualified to take their chances in the National Army.



IN CAMP WITH THE TWENTIETH ENGINEERS (FOREST)

Foresters and woodsmen in the Forest Regiments have occasion to show their skill at light housekeeping as well as in the activities of the woods. These are men of the 20th engaged in dish washing after mess at the American University, District of Columbia. The sturdy appearance of the men augurs well for the regiment's success.



MAJOR E. H. MARKS



MAJOR B. F. WADE



MAJOR A. W. CORKINS



CAPTAIN E. H. SARGENT

SOME OF THE OFFICERS OF THE 20TH ENGINEERS (FOREST).

Photographs Harris & Ewing, Washington, D. C.

Some have felt that the draft is, if possible, to be avoided; that it shows a better spirit to volunteer; and even that it is something of a reflection on Forest Service men of good experience not to be given commissions at the start.

"This point of view is wrong. The nation has established the selective draft as the approved method of raising its army. After December 15, men of draft age will no longer be accepted as volunteers. The test of real patriotism is whether we accept willingly the nation's approved plan and without halting or question take our places in the program. Forest Service men, when they clearly understand the situation, will accept the situation not only willingly, but with enthusiasm. Under the

new instructions governing the selective service we know the class into which the necessary employees of the Forest Service will fall. When that class is reached we must expect that our men will go and we must make preparation against that time. Our part, if we are within conscription age, will consist in preparing ourselves for that service. If we are not within conscription age, our part will be to help carry the work so that the absence of those who go will not prove a vital loss."

At the offices of the Forest Service it is declared that there may be much difficulty in procuring information about the work of the Forest Regiments in France. In reply to requests for articles descriptive of the operations Major Greeley, who is with the Expeditionary Forces in



AT HOME WHEREVER YOU MAY PLACE THEM

These men of the 20th Engineers (Forest) are shown waiting their turn at the hot water tubs at American University camp. Military men who have seen the Forest Battalions in drill and other work declare that they are as fine a body of men as the army has ever assembled. The outdoor life of the forester and woodsman is reflected in the physical appearance of the men here pictured, who are typical of the regiment.

France states that the censorship makes it almost impossible to send out any information of real news value. Indirect accounts received at the offices of the Service, concerning a letter to the family of one of the men of the Tenth indicate that the regiment has already had its trials. The trip across the ocean was long and exceedingly rough. Many of the men suffered severely from seasickness. Some of the biggest and huskiest had the worst time. The regiment reached France during a spell of bad weather and was exposed to steady rains for several days without an opportunity to dry things out. As a result, some of the men were on the sick list with various minor ailments. They were, however, in a hospital located at a comfortable chateau and were being well cared for. From all accounts the little English-French dictionaries are being worked overtime.

It is understood that the regiment is quartered in "billets." Word comes that "even the wood cutting camps lost in the forests of France" had a liberal allowance of turkey and "fixin's" sent them for Thanksgiving. This probably refers to the Tenth, although "lost in the forests" is not to be taken too literally. According to a bulletin of the Forest Service it has become plain that meeting the needs of the Forest Regiments for sweaters calls for swift and large expansion of the knittingwork. Colonel Mitchell, of the Twentieth, has requested immediate delivery of 1,300 sweaters and 1,600 comfort kits and other articles. The Woman's Committee for the Tenth and Twentieth Engineers was able to provide 123 sweaters, mainly knitted by Forest Service women. The Potomac Division of the Red Cross, which embraces Maryland, Virginia and the District of Columbia, with their great camps, was able to add 677. Thousands more will be needed for the Twentieth within the next two months.

The Lumber and Forest Regiments Relief Committee gave \$600 for the purchase of wool which will be knitted into sweaters for the men of the Tenth and Twentieth Regiments.

Major William B. Greeley writes from France under

recent date and makes earnest appeal for sweaters for the men of the regiments. He says that the garments are badly needed and that mufflers are also in urgent request. The mufflers are wanted particularly for men engaged in driving motor trucks and similar occupations involving exposure.

In connection with the request for knitted garments Major Greeley urges that the knitting be made fairly close for the sake of warmth. He also emphasizes the importance of shrinking the wool before knitting, in order that the garments may hold their shape. Simple instructions for shrinking have been prepared by the Forest Service. The wool in the hank should be laid out flat, in tepid water in a bathtub or other convenient place. After being there for 15 minutes it should be taken out and laid flat to dry in temperature of the living room, care being taken to prevent exposure to heat or cold. Emphasis is placed on keeping the wool flat while shrinking and drying. To

hang it up while it is wet will cause it to pull. Added tidings of the need for sweaters comes from other sources. Captain Inman F. Eldredge, Company B, Tenth Engineers (Forest), writes from the war zone as follows:

"Chaplain Williams has just notified me that the ladies of the Forest Service and the Red Cross are prepared to furnish sweaters, scarfs and wristlets to the men of this command who have none. Owing to the rough nature of the work in which our men are engaged, scarfs and wristlets would not be of great service and we would feel that we were taking them from other men who might make better use of them. For sweaters and heavy socks, however, we have a real need and the soldiers will be able to make good use of them. If they can be supplied we have need for

100 sweaters and at least 200 pairs of heavy knit socks. Socks particularly are needed, since during the coming winter many of our men will be working in a wet country."

Chaplain Williams is commissioned as a lieutenant with the Tenth. He writes: "We have just arrived in our permanent camp. It has been very cold and the sound of



MAJOR JAMES E. LONG



BREAD WAGON OF FOREST REGIMENT

This is a camp scene of daily recurrence at the camp of the 20th Engineers (Forest) at American University. The bread wagon is on its welcome round distributing supplies from the regimental bakery. It is safe to assume that the wagon will be no less welcome when the men reach the war zone.

sweaters in the making has been received with great joy. We are so near to the fighting line that we can hear the guns booming away when it is at all quiet.

"I am enclosing the names of the men in Companies D and F that desire sweaters, all of them being men who do not possess such articles and who have signed up for the same. I have written the captains of the other companies to send you similar lists for themselves, and I think it would be well if it could be done, to send the articles for each company direct to it. We have not requested scarfs or wristlets believing that men in other forms of work could use those articles to better advantage."

Impetus was given enlistments in the Forest regiments late in November by the announcement of the chief of engineers that after December 15 no man of draft age could voluntarily enlist. Accompanying this announcement was a statement calling attention to the advantage of skilled men enlisting before the expiration of the time limit in order that they might select the organizations in which they preferred to serve. "By doing this," said Major General Black, chief of engineers, "each man can render his country a greater service than by waiting for the draft and can also be placed where his experience and training will make the service better and more profitable for himself."

In addition to its contributions of men to the Forest Regiments the United States Forest Service has been called upon for various forms of activity in connection with war work.

During December there were demands for lumber

men in the aviation corps of the army. These men were wanted for service in 12 large construction squadrons being organized at the barracks at Vancouver, Washington. The woodsmen thus enlisted were for work in connection with the timber needs for airplane construction. It is probable that men from the Service and lumbermen will be needed as officers.

The Signal Corps has asked for assistance in the preparation of purchase specifications for propeller woods. The primary object is to reduce handling through a right selection at the source of supply.

The Forest Products Laboratory of the Forest Service, upon the request of the American Bureau of Shipping, is now revising the rules of the Bureau governing the use of wood in ships. The Bureau of Shipping is an organization representing shipbuilders, ship owners, and marine insurance companies, like the Lloyd's Agency in England. Its classification of ships governs the rating on which insurance depends; hence its rules have a very important influence in all shipbuilding in the United States. The present building program of the Emergency Fleet Corporation is governed by the rules of the Bureau practically in the same way as is construction for private corporations. The Forest Service will therefore exercise an important influence upon the technique of the emergency construction.

The Forest Service has also been working with the Navy on kiln construction and methods of storing kiln-dried lumber for use in airplanes. Co-operation with the Navy has also taken the form of inspection of lumber for use in airplane construction and assistance in preparing specifications for material.

WILL C. Barnes, assistant United States Forester, has returned from a five-month field trip. He reports that about 75,000 head of sheep grazed last summer on range made accessible at the head of Lake Chelan by building a barge with a capacity of 2,700 head of sheep. The barge was built by the stockmen at the suggestion of the Forest Service, and conveys the sheep from the foot of the lake to its head, about 50 miles, where they land on high summer range that could not otherwise be reached. Adjoining Canadian range affords room for additional sheep, which the Dominion authorities are willing to have admitted by the Forest Service.

THREE cases of livestock losses have been reported in which the owners have suspected enemies of the Government. One sheep man in South Park lost in a single night 1,000 sheep, for which he had just paid \$14 a head. While it is possible that the reported losses were due to poisonous plants, the State Veterinarian did not find evidences of poison, but thought the loss might have been caused by contagious pneumonia. The other two were cattle cases. Forest officers have been urged to exert unusual vigilance, particularly in the matter of looking into the presence of strangers in the vicinity of ranches and on the mountain ranges.

DISTRICT Forester F. A. Silcox, of Missoula, Montana, has resigned from the Forest Service to accept a temporary position as special assistant to the Secretary of Labor. In that capacity he will undertake an investigation of labor conditions in the Pacific Northwest. It is expected that after his work there is completed he will resume his regular duties with the Forest Service. Mr. Silcox had been commissioned as captain in the 20th Engineers (Forest) and was to have been called for service in a short time. He resigned his army commission in order to take up his new work.

THE Forest Service was represented at the recent Portland Land Show by a forest fire exhibit, which attracted considerable attention. This exhibit showed apparatus and tools used by the Service in its fire protective work and a number of bromides showing the effects of uncontrolled forest fires.

THE Forest Service will again co-operate with the Weather Bureau in keeping a record of snowfall on the National Forests this winter. Snow stakes will be read by rangers at frequent intervals. From the data obtained the Weather Bureau is able to approximate stream flow in the region for the succeeding summer.

A PROBLEM OF EROSION

BY R. S. MADDON

FORESTER, TENNESSEE GEOLOGICAL SURVEY

BECAUSE of the problems involved in forestry, Mr. Whittle's article in *AMERICAN FORESTRY* of August, on erosion, is of more than passing interest. He shows pictures of and describes eroded lands containing gulches 200 feet deep still eating back, undercutting and devastating both agricultural and forested lands. Erosion is a big problem and in some sections, particularly in the South, a serious one. On the debit side of our nation's account are being written down in nature's book huge losses not only from our forests, but also from our tilled lands. New fields are being constantly cleared to take the place of once cultivated fields now turned out as waste. Much of this newly cleared land is eroding in its turn and the cycle of destruction goes on. Certainly there must be a halt to this process if both or either of these natural resources of land and timber are to be maintained.

But while the erosion question is of most vital importance, the writing of this article was called forth because of the way in which Mr. Whittle handled his subject. Of the encroachment of eroded lands discussed by Mr. Whittle, he said: "Only one staying hand has been lifted—the dark pine forests that grip the earth with strong fingers and resolutely confront the dragons of the caverns. Where the forest is weak the chasms have pulled it down. Where the forest is strong the caverns give up the struggle. Man has taken cognizance of the combat and given his only aid to the struggle against erosion; he has learned to let the forests alone where the gorges encroach. To plant a forest athwart the line of approach has seemed futile to the farmer landowner. He realizes how long it takes to grow a forest and how formidable it has to be to withstand the undercutting of the persistent force. So that once the gorge has invaded, the farmer abandons hope of ever again bringing the land under agricultural subjection, so forbidding are the rough, steep slopes and so narrow and tortuous the bottoms of the gorges."

Whether Mr. Whittle expresses his own views or those of the landowners, on that phase of erosion is uncertain. There is, however, room for open discussion of such a

large subject. Without confuting his statements, it is practically if not wholly impossible for such large gulches to be held in check by forests at their heads. The root system of the trees extends into the ground only a short way compared to the depth of the steep, bare banks, and the undercutting will eventually cause the forests to topple over until by a catching up and filling in of the soil below there is an adjustment made between the erosive forces and the declivity of the banks, thus stopping the running-off process. The steepness of the banks is proof that the washing dirt has been carried away practically as fast as it comes down. It is not sufficient to depend upon the forested areas at the heads of these eroded lands to check the waste. Mr. Whittle

did not state whether the trees growing up from the bottoms of the gulches were now blocking the passing out of the dirt constantly washing in from the sides. If this dirt is caught and held by those trees, eventually, even if left alone to nature, a slope between the bottoms of the gulches and the top crests will be established and covered with vegetation. If the dirt passes out freely through the gulch so much the longer will the slope be in forming. But in either case, dirt must come from the banks before this final, fixed slope, as it might be called, is obtained; and during this making process it is necessary to sacrifice more and more of the forests and agricultural land

on the top of the banks until the adjusted slope is a result, unless man can come to the rescue.

To hasten the process of adjustment, the washed down dirt must be caught and held, that is, its running away must be checked. This helps to raise the bottom level of the drains and also provides stable soil on which to start permanent growth. It is next to impossible to get a growth started on a constantly shifting or moving soil. If some of the trees growing in these gulches were used in making temporary dams, then some permanent growth could be set out on the dirt caught by them in order to constitute a permanent dam. Black locust bushes, Bermuda grass and honeysuckle vines are excellent for this purpose and would no doubt be of



RECLAMATION OF GULLIED LAND

The dam was built in September, 1916, in Weakley county, Tennessee, and the black locusts shown were planted in the spring of 1917. The photograph was taken in July, 1917.



COMPARE THIS WITH THE NEXT PHOTOGRAPH

No. 1.—An area of eroded land, seemingly a hopeless waste, but really in process of reclamation, in Carroll county, Tennessee. Dams were built in the fall of 1915 and the photograph was taken in November of the same year.

much service in handling the problem discussed.

It is a wrong idea to abandon land simply because it cannot be brought back to produce crops from tillage, if this is what Mr. Whittle means by "bringing the land under agricultural subjection." Nor is it right to think trees are valueless and doing no good because they can not be marketed profitably. The slopes finally resulting from the reclamation of these severely eroded lands might be so steep as to be impossible of or impracticable for cultivation. But if trees should hold these slopes

and prevent further erosion and encroachment on valuable forests and agricultural lands above, they would command a value in themselves not to be estimated. Even though trees on such slopes and gulches were very costly to handle either for farm uses or for the market, there is a probability that the demand for timber will, after a while, give them a money value in addition to their worth for protecting lands above and checking rapid drainage.

Published herewith are photographs showing an erosion problem and how it is being handled in Tennessee.



THE RESULTS OF RECLAMATION PLAINLY TO BE SEEN

No. 2—This is the same area as shown in No. 1, in Carroll county, Tennessee, but it was set out in black locust in the spring of 1917. The large trees in the lower left-hand corner were set in the spring of 1916, above the dam shown in No. 1 in the same location.

They give an idea of the effect of planting black locusts above temporary dams so as to form a permanent dam to hold the dirt as it crumbles from the banks above. It is plain to see that after a while the banks will round off and will contain a growth of value, and the erosion will be stopped. The banks, however, must pay the price of this rounding off process. There is no other solution

unless the dirt for filling be hauled, which in such cases is wholly impracticable. The gullies in the above cut are not so deep or so steep as those Mr. Whittle describes, but the principle in each is the same, and could man aid nature, much could be done to save the forests, forest and agricultural land in the South, the destruction of which is now taking place.

FREE TREES FOR PENNSYLVANIA

NO limit will be set this year by Pennsylvania on the number of forest tree seedlings for free distribution, says Commissioner of Forestry Robert S. Conklin. Any one who wants to plant trees next spring may have them for the asking. No strings are tied to the offer, the only conditions being that applications for less than 500 trees will not be filled, applicants must pay for packing and transportation, and the trees may not be sold but must be actually planted in Pennsylvania for reforestation. No applications can be filled for ornamental trees.

The State Forest nurseries have raised more trees this year than ever before, but so many of the foresters have enlisted and so few laborers are available that the number to be planted on the State Forests probably will be even less than last year. Over 10,000,000 trees are ready to set out next spring, and as many more are in the nurseries, but are too small to plant next year.

The stock available for free distribution is almost all three years old, and includes white pine, Scotch pine, red pine, pitch pine, Norway spruce, European larch, Japanese larch and red oak. It is of better quality than any sent out last year.

FORESTRY PRIZE AWARD AT CORNELL

When the new Forestry Building was opened by the New York State College of Agriculture at Cornell University in 1914, Charles Lathrop Pack, of Lakewood, N. J., widely known as a leading conservationist, who has been closely associated with the development of forestry along the most advanced lines, made contribution of \$500 to the Forestry Department for use in its work. The money was deposited with the university treasurer for investment, the annual income to be used "in the interest of forestry." This amounts to a little over \$20, and the faculty has decided that its best use is to give an annual prize to the student in the Forestry Department who has made the best record for the year both in his studies and in his general attitude toward the work. This disposition of the money by the faculty strikes us as a wise one for it gives that little additional spur to personal incentive lent by competition, and makes it more interesting for the boys. The prize for the past year has been awarded and the winner was Samuel C. Sweeny, of Hartsdale, N. Y., a senior in the Department of Forestry. Mr. Sweeny is now in the South at one of the operations of the Bogalusa Company, getting his three months practical experience in a logging camp, which is part of the course in forestry at the New York State College of Agriculture.

A BALLAD OF THE TIMBER CRUISER

BY LEW R. SARRETT

YOHOO! Yoho! Yoho!
 You whistlin', bristlin' blizzard,
 A-sweepin' timber low,
 You buckin', blust'rin' roarer
 With your whirlin', burlin' snow!

You're snatchin' at my whiskers,
 And you're rippin' at my clothes,
 You're pawin' at my duffle-bag,
 And you're bitin' at my nose.

You've swallowed up the balsams
 With your blindin', grindin' drift,
 You've sheeted up the rapids,
 And you're workin' double-shift.

You've bluffed the lop-eared rabbit;
 Squirrel's prayin' for his soul;
 Doe's shiverin' in the tamaracks;
 Mink's popped into his hole.

Tho you've scared the whole blamed outfit,
 I'll call your brawlin' bluff—
 Here's to you! Blast and Bluster!
 Man's made of tougher stuff.

Yoho! Yoho! Yoho!
 You howlin', growlin' Norther,
 A-roarin' as you go,
 You rippin', tearin' bully
 With your icy clouds and blow!

PAPER blankets have been made, in every way as effective as 5-pound wool blankets, and only one-tenth as heavy.

THE locust which is too small for fence posts may often be sold for insulator pins and brackets for telephone and telegraph lines.

THE government is reported to have reached a decision that tree nails or wooden pins used in ship-building must be of locust or eucalyptus. The black locust will be the particular species used. This is a good fast-growing tree for New York if it can be properly protected from the locust borers.

SHUTTLE factories and other manufacturing plants use more than seven and one-half million feet of dogwood annually in this country.

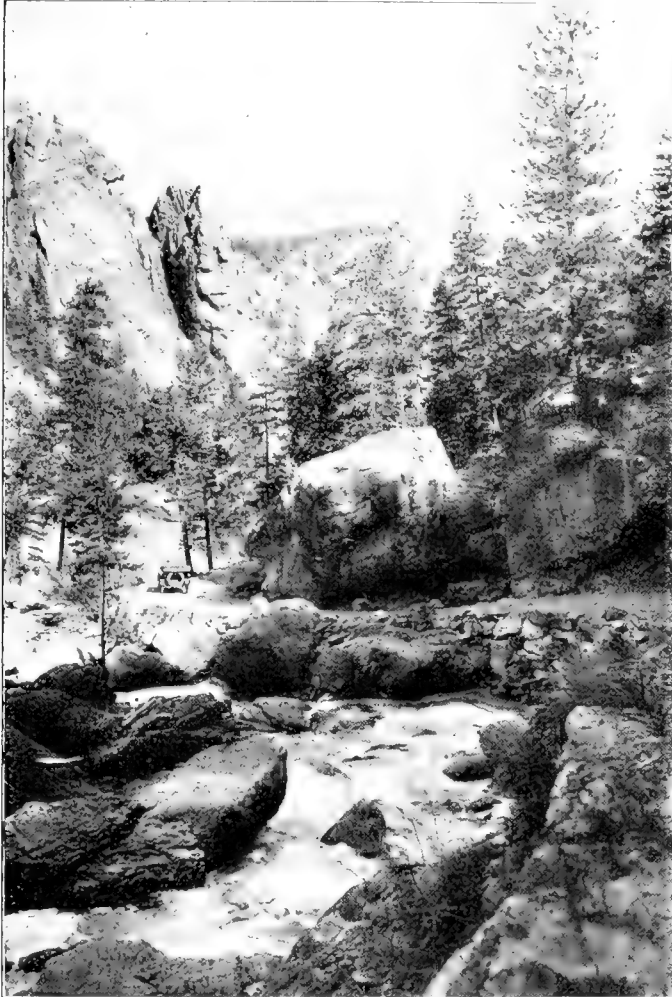
LANDSCAPING AND FORESTRY

BY SMITH RILEY

DISTRICT FORESTER

DO foresters need a knowledge of landscape engineering? Should the forest schools teach this subject?

It has been the fashion to consider the practice of forestry as tree culture upon a vegetable garden basis with every foot of space devoted to the production of wood.



SECTION OF PROPOSED ADDITION TO COLORADO NATIONAL FOREST

View in midwinter of Big Thompson River and Loveland—Estes Park auto road, with forest and cliffs in distance. Plans should be drawn to recognize careful preservation of all natural values along forest roads.

The forester has been called a lumberman who cultivates trees for volume production. In urging the creation of National Parks from National Forest areas, many have attempted to define a wide difference in the character of these areas by defining the limits to which a forester will practice his profession.

A forest, be it state or private, will always be recognized for its esthetic values. This has been demonstrated in all older countries where forests have been preserved and cultivated for centuries. We should then proceed upon the basis that it is a part of the profession of a forester to cultivate to the highest sense the values of lands

devoted to the production of trees. While this is true in the case of private forests, it is doubly true in the development of both State and National forests. Such areas devoted to forest culture will ever have a high value and be used to impart new vigor and life to toiling mankind. Such areas will also be recognized for their educational value in developing the bodies and minds of children. Can we say then that esthetic values should be ignored?

In the National Forests a forester deals largely with development in natural settings. The State Forester and in some cases the private forester deals with lands where the natural settings have been destroyed and



HORSE THIEF TRAIL ON THE UNCOMPAHGRE

Already a beautiful trail, but one which offers a splendid opportunity for constructive landscaping—to bring out values which will make it a joy to travel, even by the most unobserving.

must be recreated. In either case, the forester must appreciate the existing values or the possibilities, and such appreciation can only come from a knowledge of the subject and principles.

Upon the National Forests trees are planted and trees are cut. An eye to esthetic values in planting upon a

large scale will not go amiss. Fire-swept areas are being planted upon the slopes of Pikes Peak in the interest of water shed protection for the municipal supply of Colorado Springs and nearby towns. Certain species of trees are adaptable to given exposures and the larger trees are adaptable for planting upon moving soil. What is wanted here is a quick, attractive showing to gain publi-

over. There are hundreds of ranger stations in the National Forests where we have studied the relation of the buildings making up the station to each other, the relation of the roads and walks to the buildings and the relation of the trees, shrubs and flowers to the whole, then the relation of the whole station to the forest setting. One can imagine that every principle of landscaping

can be violated in the development of such stations so they may prove an eyesore to every visitor or passerby, or the inmates of the station. It is a well known fact that while many have no trained appreciation of esthetic values, inequalities offend an undeveloped sense to such an extent that unfavorable impressions are received and laid to other causes. With the beautiful natural settings of these forest stations and the vast variety of material to work with in the trees, shrubs, vines and flowers found throughout these areas wherever development is contemplated, much can be accomplished.

In some of the National Forests maps have been called for showing in detail the conditions



A POPULAR TOURIST RESORT ON THE PIKE NATIONAL FOREST, COLORADO

A forest, be it state or private, will always be recognized for its esthetic values, and many can testify to the popularity of the Pike, and this resort, known as Cassells

approval of the work being done. We may start this planting upon certain slopes offering a setting of high values so the earlier portion of the plantations will in a short time attract the eyes of all who approach the locality. In this way the attractions of the locality are steadily improved for the use of recreation and the work is realized and approved by the public at an early date.

A big timber sale has been made in the Superior National Forest in Minnesota. There are many lakes within the sale area. These lakes contain islands. In making the sale an exception is made of the trees near the lake shores and upon the islands. This action is taken to protect

the esthetic values. A keen appreciation of the principles of landscape engineering would undoubtedly make it possible to improve the esthetic values upon such islands and lake shores by the removal of a certain per cent of this timber. Such action would be very agreeable to the timber purchaser as he desires to remove the greatest possible volume of timber for the area worked



ON THE SUPERIOR NATIONAL FOREST, MINNESOTA

Iron Lake, near the outlet into Lac La Croix, showing the Canadian shore to the left. The esthetic values of the islands would be improved by removing a certain per cent of the timber.

at the forest stations. The relative location of the buildings, roads, walks, trees, bushes and flowers will be shown. The wind and storm directions are given consideration. After due study these maps will be used to make a working plan or ideal plan to be used in the future development. New buildings are needed—the plan will be followed in placing these buildings. The

dwelling at this station is poorly placed, a new one is contemplated. It will be located according to the plan. A ranger's wife takes a great interest in the beautification of the station grounds; such effort, if undirected, may result in inequalities, where if a plan covers this phase of the development, all effort will in the end result in an attractive station. Particular attention should be given to the use of native material that will not establish artificial conditions requiring constant attention. An example here would be the use of shrubs that would freeze down in unusual winter weather, necessitating the cost of replacement. Another example would be the use of flowers requiring cover in the winter or summer watering. Attention of this kind is costly, besides, the nature of the officer's work is such that attention cannot be given at the crucial moment. Upon the other hand, there are hundreds of beautiful wild flowers available for such work that will require no attention.

There are two schools of landscaping, the English and the Italian. The English school endeavors to reproduce or preserve natural effects. What more interesting field for the applica-

visited by thousands each summer. A beautiful tree has been left as a centerpiece to a car parking space. Owing to the grading necessary a large mound was left around the base of the tree. What plants should be put in here to cover the ground of this mound so there will be flowers in spring and summer, a pleasing symphony of fall colors in berries and foliage, not forgetting the



PUMA PASS RANGER STATION, PIKE NATIONAL FOREST

Showing Stoll Mountains in background and Ocean to Ocean Highway in foreground. The absence of trees between the station and road, and particularly around the house, spoils an otherwise attractive setting. Care in planning would obviate injury of this nature



SHERIDAN RANGER STATION, IN SUMMER

A beautifully located station, winter and summer, on which thought has been expended and an appreciation of the esthetic

tion and cultivation of this principle of landscaping can be imagined than the development and care of these forest stations?

The Forest Supervisor who cultivates a taste for landscape engineering can develop a knowledge that will be of great value to him in the administration of his forest. A camp ground has been developed upon an auto road

necessity of plants to give pleasing winter colors in buds, twigs and stems?

A summer home area is located in a canon. There are trees, conifers and hardwoods, with many varieties of shrubs scattered over the area. He who plots the lots and lays out the approach road to such an area can, by a knowledge of landscape engineering, bring to bear every factor of esthetic value. Work of this kind will make an area doubly attractive which, under an unskilled hand, would prove uninteresting to a home seeker.

A trail is needed along a ridge and to the top of a mountain.

This trail, one of the forest's network of trails, is built to make the ridge accessible for fire patrol and open a way to the top of the mountain that is to be a fire lookout point. If the man who locates this trail has a realization of the values in the grouping of natural objects—in short, if he realizes the values of this group of red fir tinged by the late afternoon or early morning sunlight,

that growth of young pine upon this angle of slope, this glimpse of a waterfall in a narrow canon backed by a group of snow peaks, this large cluster of mountain maple burdened with seed in early summer and doubly attractive in autumnal colors, this little mountain meadow or swale bright with larkspur and lupines in summer, while vivid blue with delicate fringed gentians in early fall; I say, he who sees these values can by a turn here to the right or left, a slight climb there, bring out values in this trail location that will make it a joy to traverse even by the most unappreciative while the appreciative traveler who once traverses its length will look forward with the greatest keenness to the time that may again place him in that vicinity to drink in its values in the same or other seasons of the year. Do not lose sight of the fact that this same ridge trail can be located and built in such a manner that the pleasure seeker will pass unnoticed many objects of beauty that could have been brought to him without additional cost in construction, a mere trail, in fact, to a fire lookout with attractive views here and there that have been brought out by happenstance.

One of the forester's problems of no little magnitude is that of paints for his signs, fire tool boxes and buildings of all kinds, what color schemes are adaptable, should these be in contrast to the surrounding colors or blend with those of the setting. There is some argument for direct contrast of color in those objects to which it is desirable to attract direct attention, such as

signs of all kinds, fire tool boxes, etc. Many colors for these purposes, such as brilliant reds, black upon a white background or the reverse, heavy browns or chrome yellow, will give contrasts that are foreign to a forest setting and are, therefore, displeasing. It is a well-recognized principle that greens and grays are the

colors to be used in applying the rules of the English school of landscaping, so the forester cannot go far wrong in using these colors which blend so harmoniously in every variety of forest setting. It will be found that a combination of luster green and pale gray or ivory white will give excellent contrast and yet pleasing

harmony for all manner of signs, in fact, such contrast for identification and harmony for setting that cannot be secured in any other colors. In selecting gray care should be taken to secure a dusky gray with a warm tint, as a cold or blue gray will give an unpleasing contrast that makes it unadaptable.

Congress has appropriated funds for the construction of National Forest roads in co-operation with the states and counties in which the forests are located. These roads will be located by the Forest Service, while the surveying and construction will be carried forward by the Bureau of Good Roads of

the Department of Agriculture. In arranging for these roads plans should be drawn providing for the recognition of all natural values along these roads looking to their careful preservation. I recall a beautiful group of yellow pine trees along a recently constructed western



A DELIGHTFUL SPOT IN THE SAN ISABEL NATIONAL FOREST
This view from Clubhouse Park shows the beautiful location of summer homes in the San Isabel Forest.



A PARTY JUST RETURNING FROM A TRIP TO THE SUMMIT OF PIKES PEAK

Along the Pikes Peak auto highway, where 3,600,000 young trees have been planted by the Forest Service in the interest of Colorado Springs' municipal water supply. It is not hard to foresee the esthetic value of the growing stand to the tourists who ascend this famous peak.

state road. The dirt of a shallow fill which might have been otherwise disposed of was placed against the base of the trees, which became weakened by lack of root air and were attacked and killed by the pine bark beetle, to remain skeletons of desolation along this otherwise beautiful road.

A previous study of values and a plan for the careful preservation in course of road construction will do much to retain many values with very lit-

tle additional cost, that will otherwise be destroyed.

There can be no question that a knowledge of landscape engineering will be of untold value to foresters doing constructive work. With the rapidly changing conditions in regard to forestry in this country, a knowledge of this subject will become more valuable to the practicing forester. I, therefore, feel that the forest schools should offer at least a short course in the subject.

A WONDERFUL WALNUT TREE

BY V. W. KILLICK

IN a crisis of a walnut blight epidemic, some time ago, A. R. Rideout, of Whittier, California, accidentally discovered a single tree in the orchard of Jacob Chase, three miles south of Whittier, which showed a remarkable propensity for resisting the blight disease. Rideout leased the Chase tree for a number of years, and by budding it to seedling nursery stock, produced the first "blight immune" variety of walnuts.

Rideout's success led other men to search for more specimens of blight immune trees. A few were discovered and nursery stock produced from them. All these together have contributed to save the California walnut industry from being entirely overrun with the disease.

The Chase tree is a seedling and was planted in 1886 by a Mr. Van Vorce, who secured the seed from France. It has a spread of eighty feet and stands some fifty feet high. It is very symmetrical, a vigorous grower and prolific bearer, having produced 325 pounds of nuts last year.

As the tree has become quite a landmark to the community, Rideout has built an observation tower through



THE CHASE WALNUT, AT WHITTIER, CALIFORNIA

In a crisis which threatened ruination to the walnut industry in California, this was the tree which by careful budding produced the first "blight immune" walnuts.

its foliage. The tower is fifty-five feet high and, standing upon it, one gets a very unique view of the gigantic tree from above.

DEAD LEAVES VALUABLE

DEAD leaves have a value of \$10.40 a ton as a fertilizer. Estimates Prof. Franklin Menges, farm adviser of Pennsylvania, while C. C. Logan, extension agronomist of North Carolina, declares they contain per ton 15.2 pounds of nitrogen, almost twice as much as horse or cow manure; 5.2 pounds of phosphoric acid and 8.4 pounds of potash, the total value of these plant food constituents being \$8.15.

Dr. Logan says: "It can be seen that the plant-food in a ton of fresh, dry forest leaves is worth considerable more than the plant-food in an equal amount of either cow or horse manure. In addition to this greater fertilizing value, the leaves would supply about four times as much organic material as the same amount of manure, since the latter, under ordinary conditions, contains about 80 per cent water. This organic or vegetable material is the need of practically all lawn and garden and most field soils of the state. The leaves, therefore, should be spread over such soils most in need of organic matter and be mixed in by plowing and harrowing during the fall or winter. A good rate would be 100 pounds for every 300

square feet, applied annually. If the leaves are thoroughly mixed with the soil, they will aid materially in holding water and in keeping soils moist during dry periods, thereby preventing them from running together, baking, and becoming hard. This is in addition to the goodly amount of valuable plant-food constituents supplied as seen by the table above."

Dr. Menges declares: "The composition of the leaves of different species of trees varies, but 100 pounds of leaves as they fall from the trees at this time, partly dry, contain 60 per cent water, 9 per cent nitrogen, 2 per cent phosphoric acid, 4 per cent potassium and about 2 per cent lime. A ton of leaves will contain 18 pounds nitrogen, 4 pounds phosphorus, 8 pounds potassium and about 40 pounds lime. The nitrogen, valuing it at 40 cents a pound, would be worth \$7.20, and the potassium at the same rate would be worth \$3.20. Leaving the value of the phosphorus, the lime and the organic matter out of consideration, a ton of leaves would be worth at the abnormal prices now prevailing \$10.40."

CLIMATIC RECORDS IN THE TRUNKS OF TREES

BY A. E. DOUGLASS

DEAN COLLEGE OF LETTERS, ARTS AND SCIENCES OF THE UNIVERSITY OF ARIZONA

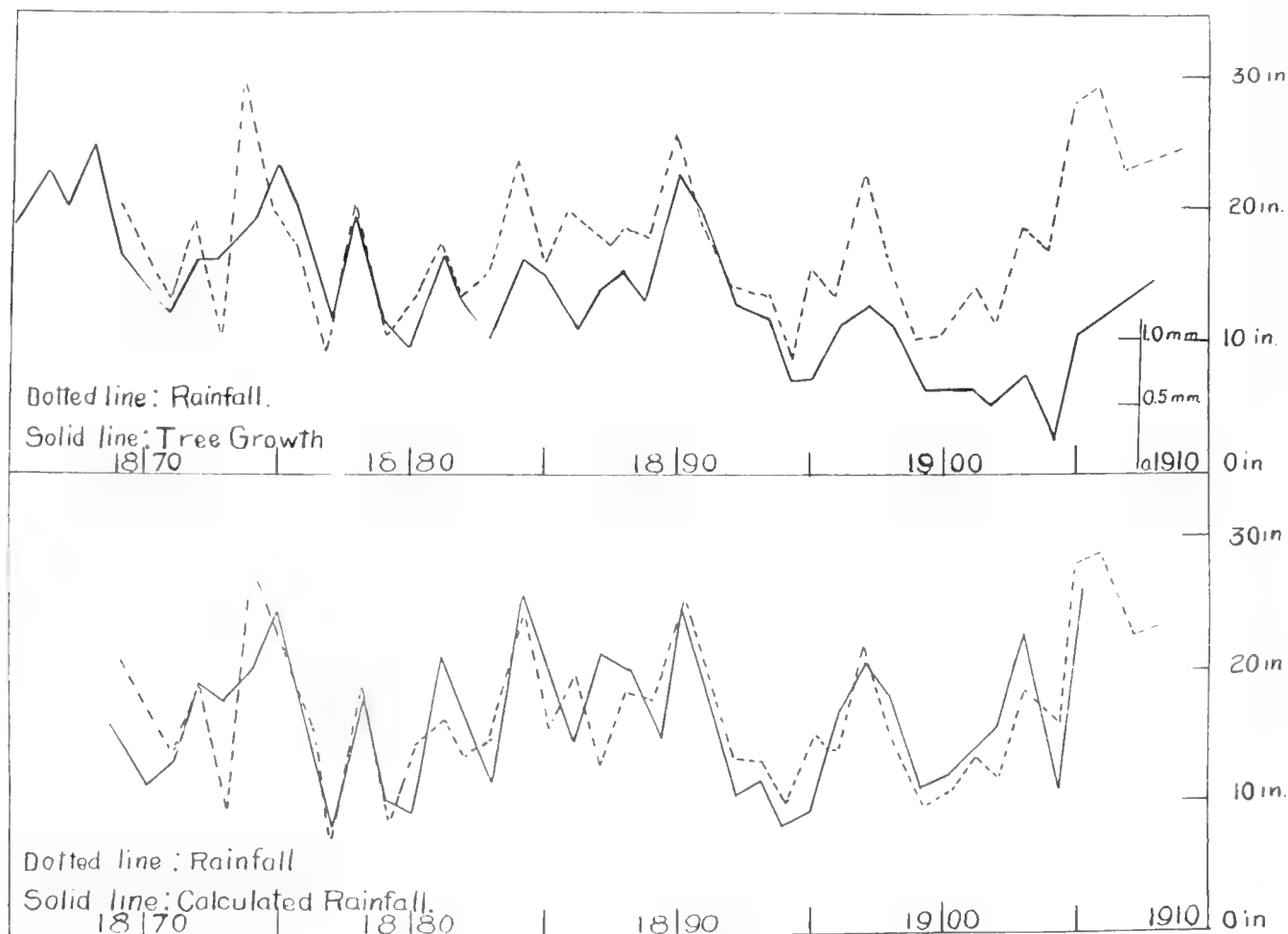
THE annual rings of trees have been found to display in their varying width a life-long record of events historically important in the life of the tree. Such events naturally have to do with favorable or adverse weather conditions, interference by competing vegetations, shade, drainage, pests, fires, and so forth. Most of these effects are well known to the forester, thus the result of forest fire is a matter of constant observation. Smoke near great iron manufactories in diminishing the rings of trees has been studied with care, and numerous interesting photographs showing it have been published by the Mellon Institute.*

In the Geological Museum at Berlin one may see samples of pine, collected by the late Professor Potonie, some grown in upland and some in swampy ground, showing wonderfully diminished growth in the latter, due to the excess of water. The effect of drainage in wet climates is beautifully shown in a small section of *Pinus sylvestris*

in the office of Professor Jelstrup, chief of the Norwegian Forest Service, at Christiania. This little section shows 17 rings of annual growth in a radius of 15 millimeters from the center. In that year trenches were dug draining the land and allowing the soil to dry in part. The remainder of the radius of the section is 40 millimeters in width, but contains only eight rings. The growth increased five and a half times after drainage.

But in the great fundamental questions of weather conditions, nature has constructed immense laboratories over the earth, some of which isolate effect of varied rainfall in a beautiful manner. In regions where the rainfall is really deficient, the tree makes a lifelong struggle against drought and, if other accidents are largely absent, that struggle is the most prominent feature of the rings. Even if the other factors are present, we must remember that the average of a group of trees, sufficiently scattered in location, will practically eliminate

*J. F. Clavenger, "Effect of the Soot in Smoke on Vegetation," Bulletin No. 7, Smoke Investigation, Mellon Inst., Pittsburgh, Pa



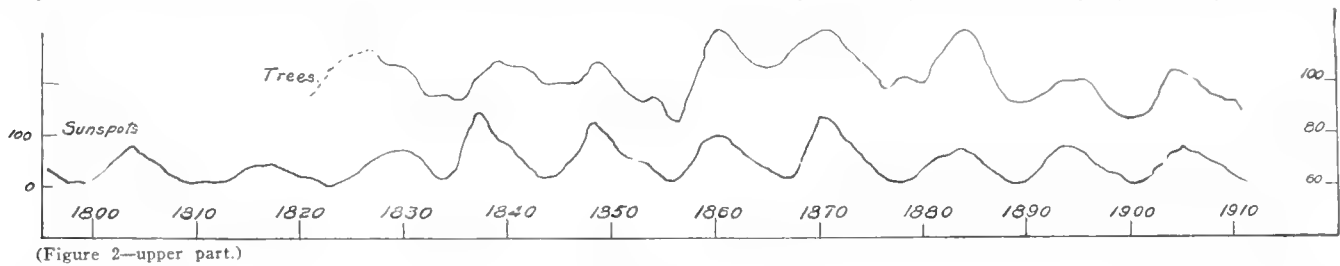
COMPARISON OF 43 YEARS OF RAINFALL AND TREE GROWTH AT PRESCOTT, ARIZONA

Fig. 1.—In the second diagram, the "Calculated Rainfall" is obtained from the Tree Growth by multiplying its value each year by three terms: First, a general coefficient changing mean tree growth to mean rainfall; second, a small factor correcting for age of tree, and third, a "conservation" factor to correct for preservation of moisture fallen in previous years. This conservation factor is very nearly the formula for "accumulated moisture" reversed.

accidents of competition, injury and so forth and that other factors such as fires, drainage and sometimes pests, which themselves depend on weather, actually exaggerate climatic effects. Hence if in rigorous surroundings we can show empirically a relation between tree growth and terrestrial or cosmic conditions, we are justified in regarding it as a genuine case of cause and effect.

Long residence in the great yellow pine forest of Northern Arizona led me to the study of that tree especially. In 1907 I had made and reduced ten thousand

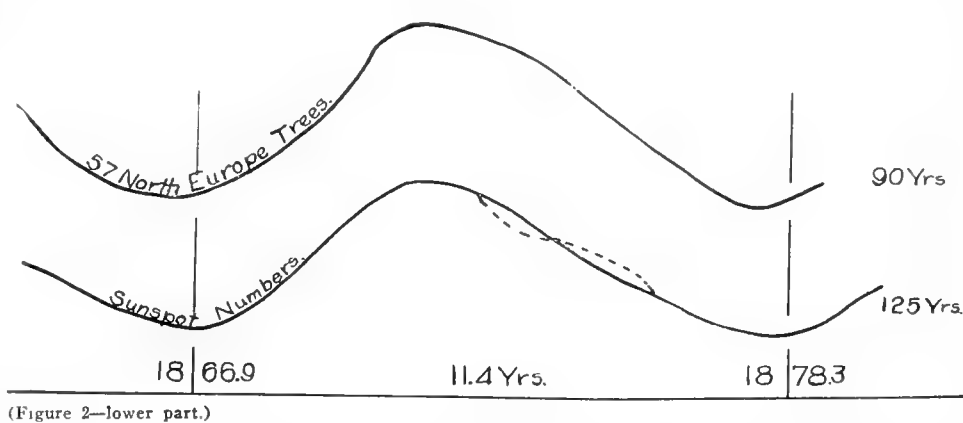
trees the cross-identification was more essential, for in that region two causes operate to produce errors in ring counting; first, the strongly marked double rainy season (winter and summer) producing rarely an extra ring which resembles the annual rings; and second, the occasional series of deficient years causing some trees, in part of their growth at least, to stop ring production for one or more years. The error there of straightaway counting was found to average four per cent in the last two hundred years. By cross identifying all rings this error



measures upon twenty-five long-lived trees. Four years later three or four thousand very careful measures upon the last fifty years of nearly seventy different trees were added. And now I have nine thousand more

upon eighty different samples of the European *Pinus sylvestris* or common pine of North Europe. The conifers, by the great regions they cover, the great variety of climates they endure, and especially by the prominence of their rings, seem best adapted to this purpose.

Apart from care in measuring the rings, the details of which have largely been described (Monthly Weather Review, June, 1909, and Bull. Am. Geog. Soc., May, 1914, Carnegie Publications, No. 192, Chapter XI.), the most fundamental and essential feature of the method is the cross-identification of rings among a group of trees. The ease and accuracy with which this can be done in a fairly homogeneous forest is remarkable. A group of thirteen tree sections collected along a distance of a quarter of a mile in the forest of Eberswalde, near Berlin, show almost identical records. Two to ten rings in every decade had enough individuality to make them recognizable in every tree. A group of twelve sections from Central Sweden, cut, however, from logs at the sawmill at Gefle, show such agreement that there is not a single questionable ring in the last hundred years or more. Especially marked combinations of rings could occasionally be traced across Europe between the groups hereinafter mentioned. In Arizona, identification across seventy miles of country was unquestioned and even at two hundred miles resemblance was apparent. But in Arizona



(Figure 2—lower part.)

COMPARISON BETWEEN 57 NORTH EUROPE PINE TREES (smoothed) AND SUNSPOT NUMBERS

The trees are from England, Norway, Sweden and North Germany.

was reduced to half of one per cent or perhaps to zero. Recently I have made an interesting check on the accuracy of the accepted identification by noting every statement of weather, freshets or crop failures mentioned by

the historian Bancroft in his accounts of the settlements of Arizona and New Mexico. I find fourteen cases in which the noted feature of the year agrees with the tree record, and but one doubtful disagreement. The most striking correspondences occur with reference to the flood on the Rio Grande in 1680, the famines between 1680 and 1690, and the droughts in Arizona in 1748, 1780 and 1821.

The accuracy with which the pine trees near Prescott, Arizona, represent the rainfall recorded in that city for forty-three years, is, without correction, about seventy per cent (Figure 1.) By a provisional correction for conservation of moisture by the soil, this accuracy rises to about eighty-two per cent. The nature of this conservation correction is very simple, it is practically the "accumulated moisture" of the meteorologists. It signifies that the rings in these dry climate trees vary not merely in proportion to the rainfall of the year but also in proportion to the sum of the profits and losses of the preceding years. The "credit balance" in their books at the beginning of the year has only somewhat less importance than the income during the current year. One must remember that conservation in this dry climate may be very different in its action from that in wet climates where the ground is continually moist or water-soaked.

In reckoning the amount of moisture for the year

one must remember also that precipitation in the form of snow goes over to the following spring growth and should be included in the rainfall of the succeeding year. Also in regions where there is a pronounced double rainy season, heavy precipitation in winter is necessary in order to tide over the spring drought, otherwise the tree may put on a false ring (usually easily distinguishable) or even in extreme cases stop growing for the year and show no effect of the summer rains. These features are finely shown in the Prescott trees.*

In the eighty sections recently examined or collected in North Europe a striking coincidence was found between the growth of these trees and solar phenomena (Figure 2.) That some such agreement should exist was not entirely unexpected. The question of the relation between sunspots and weather is one upon which doctors—and noted ones—have disagreed. This investigation was begun to see whether the trees, by representing the weather, would show such connection, if any exists. A very strong and very reasonable connection was found between tree growth and rainfall in Arizona. But also substantial evidence was found of a relation to sunspots. To give some idea of it one may say that in the last hundred and sixty years, ten out of the fourteen sunspot Maxima and Minima have been followed about four years later by pronounced maxima and minima in the tree growth. Also during some two hundred and fifty years of the early growth of these trees they show a strongly marked eleven-year variation.

But in the very first group of European trees studied, those obtained at Eberswalde, near Berlin, the remarkable fact became at once apparent that these thirteen trees from one of those beautiful German forests, show the eleven-year sunspot curve since 1830 more accurately than do the corresponding curves of rainfall or temperature. The eleven-year variation in the trees is shown in the accompanying photograph of one of the Eberswalde sections (Figure 3.) It will be seen at once that there is a rhythmic sway in growth, large rings alternating with small ones. The arrows placed on the photograph are not there to call attention to the larger

growth but to mark the years of maximum sunspots. The other twelve trees of that group do not show quite so perfect rhythm as this particular part of this section but are like the other parts of this section, showing strongly a majority of the maxima. Taking the group as a whole the agreement is highly conspicuous and the maximum growth comes within six-tenths of a year of the sunspot maximum.

In order to test further this coincidence, groups of tree sections were obtained from other parts of Northern Europe, namely, Southern England, outer coast of Norway, scattered places along the inner coast of Norway, Christiania, Central Sweden, scattered localities in Sweden, Northwest Austria and Southern Bavaria.

Five of these eight groups are of the Eberswalde type and show the sunspot variation. Of the other three, the trees from the inner coast of Norway as a whole appear to show a reversed cycle, probably because they are deep inland valleys while the southern groups, Northwest Austria and Southern Bavaria, close to the Alps, have combined agreement and disagreement so that they cannot as yet be considered to give a definite result. In the six groups, however, representing the triangle between England, Northern Germany and the lower Skandinavian Peninsula, a variation in growth since 1820 showing pronounced agreement with the sunspot curve is unmistakable. Every sunspot maximum and minimum since that date appears in the trees with an average difference in growth of twenty per cent between them. This is shown in the diagram ac-



TREE SECTION, *PINUS SYLVESTRIS*, FROM NORTH GERMANY
Figure 3—The arrows mark the years of greatest sunspots. Note the periodic character of growth.

companying this article. The next most pronounced feature is that five of the eight minima show a small and brief increase in tree growth. This suggestion of a second maximum is of interest because in it we find agreement with Hann and Hellmann in their studies of European rainfall and sunspots and lend added weight to results which each author obtained but which neither allowed himself to regard as conclusive. In the splendid work of Hellmann upon the rainfall of the North German drainage area, it is this inconspicuous maximum which he finds the more important of the two.

In summarizing, two facts and a conclusion stand out prominently. First, it has been shown that trees may,

*See chapter by the writer in "The Climatic Factor," Carnegie Publications, 192.

and some in dry climates do, give a valuable record of annual rainfall; second, it has been shown that trees may, and some in wet climates do, give an excellent record of sunspot activity. Now, unless we introduce some new agency such as a profound changing stimulation in the direct solar rays, a subject well worth investigating, we must regard the trees as receiving their solar influence through the medium of the weather, and are forced to the conclusion that there is a connection of some sort between solar activity as displayed in sunspots and the weather, which by the aid of tree growth we have a most extensive means of investigating. Here then we are presented with a most fascinating field for future work. We must admit from the photograph and curves that there is a physical connection between solar activity and the growth of vegetation, certainly as represented in trees of certain districts. But the nature of this connection, through what weather element or elements it takes place, just how the sun affects those elements, even the exact causes of sunspots and why they recur in larger numbers every eleven years, are questions which will only be cleared up by extensive investigations.

One final practical word is well worth saying to lovers of forests. The account here given presents an idea of the value of records contained in trees. It is the oldest trees containing the longest records which are likely to die or be cut down first. So it is within the power of those having the care of forests, when the very old trees have to be removed, to preserve sections, marking them carefully with the month and year and locality, and thus preserve for future investigators, sources of information which, once lost, can never be replaced.

WHITE PINE BLISTER DISEASE

AT a recent meeting in Pittsburgh of the Committee on the Suppression of the Pine Blister Rust in North America about 30 representatives from the Department of Agriculture and various states and Canadian provinces were present. It was brought out that the blister rust is probably worse in Northern than in Southern Europe, and that it may, therefore, prove particularly destructive in the Northern United States and Canada. Dr. Spaulding, of the Office of Forest Pathology, stated that he believes the blister rust is more virulent on healthy, growing trees than on weaker ones. Wind is probably the main agent in distributing the disease, but birds and insects are also responsible. The disease is so firmly established in New England and New York, and probably in Ontario, as to make its eradication impossible. It is more widely distributed in the Lake States than it was a year ago, particularly in the St. Croix River Valley. So far as known, it has not been introduced in the western white or sugar pine regions.

NOT everyone knows that the first Pennsylvanian to really appreciate the value of forests was William Penn himself. In 1681 he provided that for every five acres cleared in Pennsylvania one acre should be left in woods.

DONATIONS TO THE LUMBER AND FOREST REGIMENTS RELIEF COMMITTEE

AMERICAN FORESTRY will publish each month the list of those making donations to this fund since the fifth of the preceding month. Practically all of the donations so far received have been made without solicitation and were inspired by reading in the magazine that a relief and comfort fund for the men of the forest regiments was to be started.

Contributions to and including December 5, 1917, are as follows:

W. R. Brown, Berlin, N. H.	\$500 00
The Southern Lumberman, St. Louis, Mo.	25 00
L. H. Daloz, Boston, Mass.	12 00
L. F. Beigham, Chestnut Hill, Mass.	12 00
Wash. Heights Century Club, Wilmington, Del.	10 50
Cleveland Oconee Lumber Co., Atlanta, Ga.	10 00
John C. Freund, New York City	10 00
I. T. Beckwith, New York City	10 00
W. H. McElwee, Raleigh, N. C.	10 00
W. B. Marshon, Saginaw, Mich.	1 00
Clarence Hay, New York City	7 00
Mrs. T. M. Ives, New York City	7 00
C. I. McNair, Cloquet, Minn.	7 00
F. R. Thorns, New York City	7 00
Frederick R. Simms, Chislehurst, England	6 50
F. A. Chace, Fall River, Mass.	5 00
Dover, Del., Century Club	5 00
Newark, Del., New Century Club	5 00
Acorn Club, Seaford, Del.	5 00
Mrs. Wm. R. Cabot, Boston, Mass.	4 00
Miss Harriet Fearing, Baltimore, Md.	4 00
Miss Anna G. Bard, Huenema, Cal.	2 00
Mrs. James H. Beal, Boston, Mass.	2 00
Miss Bertha G. Brooks, New York City	2 00
Miss G. S. Cary, Boston, Mass.	2 00
Miss C. G. Curris, Intervale, N. H.	2 00
Mrs. Geo. H. Hosmer, Ithaca, N. Y.	2 00
Miss Lucy Lewis Hay, Philadelphia	1 00
Mr. and Mrs. J. H. Lesh, Newton Center, Mass.	1 00
Wm. S. Perot, Conshohocken, Pa.	1 00
Total	\$687.00

THE FOREST FIRE SEASON

TAKEN as a whole, the forest fire season of 1917 has been the most serious throughout the West since 1910. Not since that year has the Forest Service been put to so severe a test. California escaped with less damage than the Northwest, where 7,688 fires were reported, entailing an expenditure of \$1,825,000 for fire protection. In August the Governor of Oregon placed detachments of troops throughout the state where incendiary fires were prevalent, and closed the hunting season after it had been open for a week. In the State of Washington the forest fire wardens controlled bad fires at the expense of those responsible for their origin, a measure which was said to prove very effective.

THE California Packing Corporation of San Francisco was awarded the sale of 233,000,000 feet of timber on the Norval Flat-McCoy chance on the Lassen National Forest. Three bids were received, that of the successful competitor being 10 cents per thousand above the minimum. The prices to be paid are: For yellow, Jeffrey, and sugar pine, on the Norval Flat, \$2.85; on the McCoy chance, \$3.00; for fir on both, 50 cents per thousand.

THE WOODPECKERS

(Family Picidae)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

FEW birds are more easily recognized by the layman or the amateur ornithologist than are the woodpeckers. In spite of the fact that they constitute a large family of over 375 species and are found over the entire world, except in Madagascar and the Australian region, they are remarkably uniform in their habits and in their modifications. Indeed, some of the distinct and even strikingly marked species, like our downy and hairy woodpeckers, resemble each other almost feather for feather. Twenty-four of the nearly 200 species of woodpeckers occurring in the New World are found in North America.

The typical woodpeckers have large heads with stout chisel-like bills which end in a narrow edge rather than a point, and are thus well suited for chipping wood. Their tongues are very long, capable of being protruded a couple of inches beyond the tip of the bill, and have recurved barbs at the tip. This combination of bill and tongue make a perfect tool for drilling into the chambers of wood-boring larvae and spearing the concealed grub. For this reason woodpeckers are considered one of the most valuable groups of birds.

The tail feathers of the woodpeckers are very stiff and pointed and serve as props to support the weight of the birds as they climb the trunks of the trees in their characteristic manner. The tiny woodpeckers of South America and Africa, called piculets, and the four species of wrynecks of the Old World, however, have soft tails.

The feet of woodpeckers, likewise, are adapted to this climbing habit and differ from all of the birds that we have thus far considered, in having two toes directed forward and two backward. Thus they serve as pincers for better grasping the bark. In a few species, the three-toed woodpeckers of northern North America, one hind toe has been lost.

Because of all these modifications, the woodpeckers are separated from the Order Passeres or "Perching Birds" to which the families heretofore considered be-

long, and are put in an order by themselves, the Pici.

In color, the woodpeckers vary from the common black and white varieties, through various shades of brown and green, to those that are brilliant scarlet and yellow. In fact, patches of scarlet are found on the heads of the males of most species, even the most dully colored.

Woodpeckers are usually solitary birds and even the family parties disperse soon after the young are able to care for themselves. Our northern species, however, sometimes gather in scattered groups during the winter, often accompanying the flocks of chickadees and nuthatches, and regularly come to feeding stations main-

tained for them. In fact, they become so fond of suet that they continue to visit pieces hung in the trees all through the summer months, even when they drip in the sun and become rancid. They even feed their young with some suet and bring them to it when they are able to fly.

In nesting habits also, woodpeckers are remarkably uniform, for they all drill holes in dead or soft-wooded trees and lay their eggs on the chips at the bottom of the cavity. The size of the hole varies from about one and a half inches in diameter with the downy to two and a half inches with the flicker, and is correspondingly larger with the pileated and ivory-billed species. The hole is directed toward the center of the tree but a short dis-

tance and then drops downward for from six to eight inches to two feet and is usually enlarged toward the bottom for the convenience of the incubating bird. Usually both birds assist in drilling the hole and often carry the chips to some distance from the tree in order not to attract attention to it. The eggs are always glossy white and unspotted, but the number varies with the different species from four to twelve. There is one celebrated case of a flicker which continued to lay as often as the eggs were removed, until it had laid 71 eggs in 73 days.

Most woodpeckers excavate new nesting cavities each year, but some return to the same hole year after year.



A RED HEADED WOODPECKER RETURNING TO HIS APARTMENT

When he returned from the South a flicker had usurped his previous years' hole and he was compelled to drill another higher up. The two families had frequent quarrels.

particularly the flickers and red-headed woodpeckers. Some make roosting holes for the winter or for the male bird while the female is incubating. In Europe several species of woodpeckers have come to use artificial nesting boxes put up for them, but, in this country, the flicker is, as yet, the only one that does so regularly. Other species will undoubtedly learn to do so as time goes on and available dead trees become scarcer and nesting boxes more plentiful.

To be acceptable to a flicker, a nesting box should be from six to eight inches square inside, and from 18 inches to two feet deep. The hole should measure two and a half to three inches in diameter and should be on one side, a couple of inches from the top. The inside of the box should be rough. The best place for the box is 15 or more feet from the ground, on the straight bole of a tree free from branches, on a dead tree, or on the top of a tree that has been cut off. Inasmuch as woodpeckers build no nests at the bottom of their holes, but merely lay their eggs on the chips at the bottom, it is necessary



THE HOMING BIRD

A flicker coming home to the nest that it has occupied for three successive years. The scaffolding and the box at the right show how the next photograph was secured, the camera being put in place of the box and the shutter worked with a string.

to put about two inches of sawdust or ground cork in the bottom of the box to keep the eggs from rolling around.

Woodpeckers have no true song and their call notes are inclined to be harsh and unmusical. In place of a song, the males, and possibly the females at times, have a loud rolling tattoo which they make by hammering with the bill upon a dead limb, a loose piece of bark, a drain pipe, tin roof or other resonant surface.

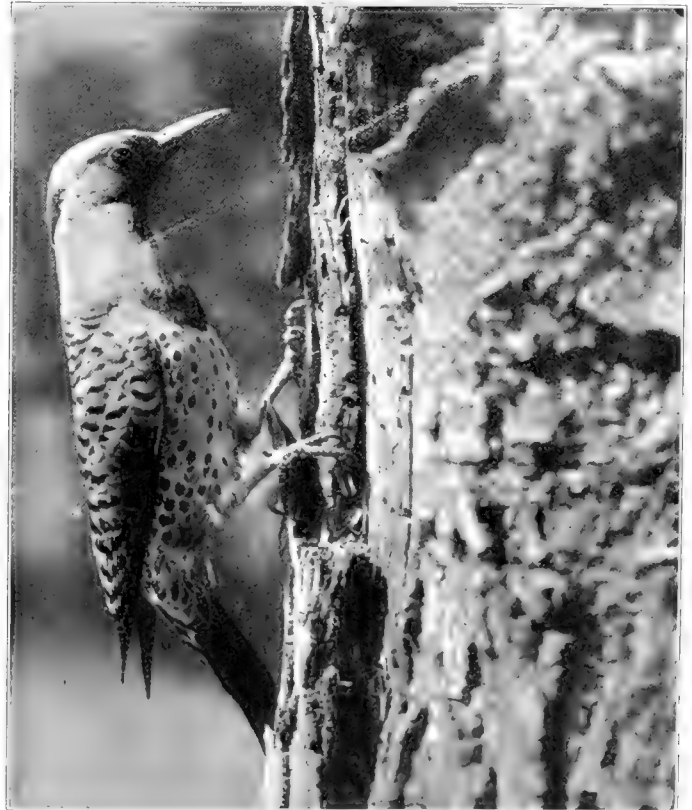
The most striking member of the woodpecker family in North America is the red-headed species, found from Ontario to the Gulf and from Colorado to the Atlantic,



"BIRDS OF A FEATHER FLOCK TOGETHER"

A downy and hairy woodpecker at a feeding station. When they are seen together the difference in size is very apparent but otherwise the two species are easily confused.

although for some reason it is rather rare in some localities, particularly in New England. Males and females are alike with the entire head a deep red, the back and most of the wings blue black and the secondaries of the wings, the lower back and underparts pure white, giving them a most conspicuous appearance, especially in flight. The males of many species of woodpeckers have more



THE FLICKER AT ITS NEST

Note the feet with two toes forward and two backward, characteristic of the family. The flicker's bill is slightly curved and more pointed than other members and his habits are different.



Photograph by C. W. Leister

A RED-HEADED WOODPECKER RETURNING TO ITS NEST

The hole has been cut so neatly through the bark that it is difficult to see it in the photograph.

or less red on the head, but no other has the entire head red.

Redheads are versatile birds in their feeding habits, and though they drill for their food less than the downy and hairy species, they often fly out after passing insects like the flycatchers or get down on the ground in search of ants and worms like the thrushes. Occasionally individuals arouse the enmity of the whole bird and human world by taking on nest robbing habits, eating the eggs or young of smaller birds. In the fall of the year their



A DOWNY WOODPECKER AFTER SUET

The suet has been rammed into a hole bored for it so that crows and squirrels cannot carry it away in one piece

presence in a locality is largely dependent upon the supply of beechnuts, chestnuts or acorns, and at these times great disputes often occur between the redheads and the blue jays for the possession of certain nut trees and for a time such trees present a riot of color. Like the nuthatches, redheads often store nuts for winter use in the crevices of the bark or in fence posts. If the nut crop is good redheads are likely to pass the winter as far north as northern New York or Ontario, but otherwise they retire south of Maryland.

More abundant in most places than the redhead is the flicker, the only brown woodpecker in the United States. The flicker is known by various local names, such as high-hole or high-holder, clape, wickup, wake-robin, golden-winged woodpecker, and over 100 others which space forbids to mention. The flicker is about the size



PROVING HIS TRUST IN MAN

A hairy woodpecker taking suet from the window casing. The photograph was taken through the window.

of the redhead, somewhat larger than a robin, brown above barred with black, light brown below spotted with black, and grayer on the head. Its most characteristic marks are a red crescent on the back of the head, a black crescent on the breast, a white patch on the rump, and golden yellow lining to the wings and tail. The western flicker has this lining of the wings and tail red instead of yellow.

The flicker is a rather aberrant member of the family and now seldom drills for boring larvae. Its favorite food is ants, which it secures by drilling into their nests upon the ground. Thus it is frequently seen hopping about lawns with the robins. Its bill is slightly curved

and less chisel-like than most woodpeckers', and its tongue, instead of being barbed, has a sticky secretion poured upon it from the modified salivary glands which entangles the ants.

The downy and hairy woodpeckers are found throughout North America east of the Rockies, and are perhaps the best known of all the woodpeckers. The northern and southern birds have been separated into distinct races because of slight differences in size, but, to all appearances, the birds are the same. The two species are almost exactly alike, except for size, the hairy woodpecker being about the size of a robin (9.4 inches in length), and the downy somewhat larger than a sparrow (6.8 inches). Both birds are striped black and white above, and pure white below, about the only difference being that the outer tail feathers of the hairy are pure white, while in the downy, they are barred with black. The males of each species have a crescent of bright scarlet on back of the head, that of the hairy being divided through the middle by black. Both species are permanent residents where found, and often nest in the vicinity of the place where they are fed in winter.

Another familiar species of the southern states, ranging as far north as southern New York, is the red-bellied woodpecker. It is a noisy bird about the size of the hairy, but with the whole top of the head red and with the back barred rather than striped. The red of the



WOODPECKERS ARE VALUABLE BIRDS

A downy woodpecker and indisputable evidence of his routing of bark beetles from his territory.

belly is quite inconspicuous. Like other woodpeckers, it is fond of suet.

The largest of all the woodpeckers is the ivory-billed species, a bird about the size of a crow, and fully as black, with a scarlet crest, a white stripe on each side of the neck, and large white patches in the wings. It was formerly not an uncommon bird in the larger forests of

the South Atlantic and Gulf States but now is confined to the largest and most remote cypress swamps of the lower Mississippi Valley and Gulf States, where it is on the verge of extinction. It is a wild, shy bird, and cannot withstand the encroachments of civilization and the lumber mill.



"WELCOME HOME"

The downy returns with a full market basket of supplies for his always hungry young family.

Nearly as large and much more widespread, though confined to the forests, is the pileated woodpecker. It is similar in color to the ivory-billed, but has somewhat lighter underparts and does not have the white in the wings so conspicuous or the ivory-white bill. The northern and the southern forms of this bird range from Quebec to the Gulf, but it is nowhere a common bird. In the cypress swamps of Georgia and Florida, however, it occurs in numbers.

The red cockaded woodpecker is one of the less well known woodpeckers of the South, found in the pine forests. It is similar to a hairy woodpecker in general appearance, but has the back barred with black and white and has black streaks on its sides.

The three-toed woodpeckers, of which there are two species inhabiting the boreal regions and coming southward in winter to northern United States, are also about the size of the hairy, but have an orange yellow patch on top of the head.

In the West are found the California Woodpecker, which has the habit of storing acorns in holes which it drills in the bark of trees, the gila and golden-fronted woodpeckers, which resemble the red-bellied species; the Lewis woodpecker, the greenest of the North American species; the red-naped, red-breasted and Williamson sapsuckers which are similar in habits to the eastern yellow-bellied sapsucker.

The sapsuckers get the name from their habit of drill-

ing rows of small round holes in the bark of many species of trees and drinking the sap which collects. One bird usually taps several different trees and each one in several places, and then makes the rounds as often as the sap collects. It is interesting to note that the barbs on the tongue, so characteristic of the woodpeckers, have



Photograph by G. A. Bailey.

HE ALSO LIKES SUET

A red-bellied woodpecker at a feeding station. This is a southern species, but ranges as far north as southern New York.

been modified into a fringe or brush for collecting the sap. Sapsuckers eat likewise such insects as are attracted by the sap and, like the red-headed woodpeckers, are quite expert at catching insects on the wing. In addition they eat some of the soft inner bark exposed when the holes are being drilled, and, in soft-wooded trees, like the poplar, where the sap does not flow freely, and the cambium is almost gelatinous, they sometimes peck off fairly large areas. Ordinarily their rows of holes do not overlap and little or no damage is done to the tree, but sometimes, when the birds are very numerous, and for some reason persist in attacking a particular ornamental evergreen or mountain ash, they ruin its appearance, seriously weaken it, or even kill it. The holes drilled by the sapsucker often stain the underlying timber, causing what

THE use of creosoted wood blocks, which originally began as paving material for city streets, has now spread into many other lines, according to a statement issued by the United States Forest Service. The durability of such pavement, the noiselessness under heavy traffic, and its sanitary properties give creosoted wood block especial value for use where heavy trucking takes place, and such flooring is now found throughout the country in factories, warehouses, machine shops, foundries, quarries and docks, and even in hotel kitchens, hospitals, laundries and slaughter houses.

are known as "bird pecks," and are said by lumber dealers to cause a devaluation to timber of the United States of nearly a million dollars annually.

At times sapsuckers behave in an erratic and foolish manner, zigzagging through the trees with no apparent reason, flying into windows or walls or the sides of houses, even becoming so stupid as to allow themselves to be picked from the trees, or alighting on one's person and climbing up his leg as though it were the limb of a tree. It has been suggested that the sap ferments in the sun and that the sapsuckers become intoxicated, but this theory has by no means been proved.

The common sapsucker of the East is the yellow-bellied species. It is about the size of a hairy woodpecker with the same general appearance, but has the throat and the whole top of the head red. It has also a conspicuous



YELLOW-BELLIED SAPSUCKER

The Sapsucker at his sugar bush. The numerous round holes drilled to get the sap do not usually injure the trees, but sometimes do, and stain the underlying timber.

white stripe on each wing, a black crescent on the breast, and slightly yellowish under parts which are somewhat streaked. The female has a white throat and of immature birds the top of the head is black.

IN the study of wood using industries foresters from Syracuse University have discovered an Onondaga County man who has an interesting water-power saw mill. When the power is not needed for the saw mill he runs either a grist mill, or a cider mill with it. He also has a small electric light plant operated by the same power. The mill has been in operation for more than twenty-five years. Authorities at the College of Forestry say that full and profitable utilization of the woodlot products will be assured only when the State is dotted with these "many purpose" mills.

WOOD TO THE FRONT AS WARTIME FUEL

WITH every section of the country clamoring for coal and with the railroads experiencing the worst traffic congestion in the history of the United States, recourse is had to the forests as affording a solution of the wartime fuel crisis. From those in authority has come the call for the use of wood as winter fuel in the household and wherever else its use is possible. Briefly and baldly stated, there is not enough coal to go around, and unless wood is used in its stead the coal famine will prove disastrous.

Reduced to figures the coal shortage amounts to fifty million tons. This means two and one-half tons for each of the twenty million families in the United States. To transport this amount of coal would require the use of a million coal cars of fifty tons capacity apiece. In saving this strain on already overtaxed transportation lines and in conserving the fuel supply of the nation it is argued that the individual household can show a measure of patriotism which is vital to the national strength.

Nor does the demand for fuel conservation limit itself to the household. The United States Government has pointed out that churches can make important contribution by using wood in their furnaces. The experts maintain that wood is even better than coal for heating churches lodge rooms and other places where heat is not constantly required. When heat is wanted in places of occasional assemblage it is required quickly and in large volume. For such purpose no other fuel answers as well as wood. The saving to be effected by use of wood would in these instances work no hardships and the aggregate would be of tremendous importance in making the available supply of coal meet imperative needs.

Definite plans for the substitution of wood for coal have been worked out by the United States Fuel Administration and state organizations all over the country. New England was one of the first sections to take active heed of the situation. Early in December New England

was several million tons short of its requirements for soft coal. Hard coal had been in fairly plentiful supply during September and October, but with the increased needs of winter there was not enough to meet the demand. Every effort was made by the fuel administration to facilitate shipments and to secure the economical use of the coal received, but even after curtailing or eliminating unnecessary forms of use the situation was steadily becoming more serious. The outlook for improvement in future deliveries was unfavorable and the fuel administrator took steps to warn the public of the situation and to urge that personal and community prudence, as well

as national patriotism, required that New England begin at once to utilize her native supply of cordwood to the fullest possible extent.

It has been ascertained that the supply of wood now on hand throughout the New England states is considerably less even than normal requirements. With increased stringency in the coal situation practically certain and with the possibility that another winter will find the condition even worse, earnest efforts are being made to stimulate wood cutting and wood using without delay. To this end local committees of public safety in all wood producing localities and county agents throughout the various states have been requested to take inventory of all available supplies of cordwood stumpage within reasonable dis-

tance of a market and to endeavor to arrange for its immediate conversion into fuel.

As the text of this campaign a poster issued by James J. Storrow, federal fuel administrator for Massachusetts, and published herewith, makes the statement that New England must burn more wood; that the coal shortage is serious and that this condition is likely to continue during the war.

The New England movement is typical of the intensive campaigns inaugurated throughout the country under the guidance of the United States Fuel Administration,

CUT-A-CORD

NEW ENGLAND must BURN more WOOD.
THE COAL SHORTAGE IS SERIOUS.
A condition likely to continue during the war.

STOVE AND FURNACE WOOD EVERYWHERE IN DEMAND

War Ships and Munition Plants Cannot Burn Wood
We Ought Not to Demand the Coal They Need
New England Volunteers Her Woodlands in the Emergency

If You Own a Wood Lot

Cut Some Wood in the Service of Your Country

If you need fuel, BUY WOOD FROM YOUR FARM
NEIGHBORS. Order now what you will need later. Let the
choppers know who will take their wood. There is another
winter coming after this.

Comparative Fuel Values of Green and Dry Wood		Relative Fuel Value of a Cord of Dry Wood in Tons of Hard Coal		
Wood seasoned 12 months, fuel value	100 per cent.	One Cord Approximately Equal to 1 Ton	One Cord Approximately Equal to 3 1/2 Tons	One Cord Approximately Equal to 1 1/2 Tons
" " 9 " " "	95 " "	HICKORY	BASSWOOD	PINE
" " 6 " " "	90 " "	OAK	SOFT MAPLE	ASPEN
" " 3 " " "	85 " "	HARD MAPLE	CHESTNUT	HICKORY
" " 0 " " "	65 " "	BEECH	GRAY BIRCH	CEDAR
		ASH	SPRUCE	BALSAW
		BIRCH	POPLAR	
		APPLE		

Coal burning stoves and furnaces may be adapted for burning wood by placing strips of sheet iron over the grates or by use of fire brick.

OFFICE OF **JAMES J. STORROW,**
Federal Fuel Administrator for Massachusetts, State House, Boston

in co-operation with the Department of Agriculture. The Southern states have vast supplies of wood and activities are already under way in that section looking toward the substitution of wood for coal. The Department of Agriculture has volunteered to provide the services of expert foresters who will supervise the cutting of wood so that no damage may be done to growing timber and in order that the largest use may be obtained of the supply of wood. In addition to this source of supply the government has statistics to show that there is a large quantity of dead wood in many sections of the country and that the supply in many communities is large enough for the entire needs for domestic purposes. In many instances this wood is destroyed as waste.

One cord of hardwood is declared to equal a ton of hard coal in fuel value. This takes in such woods as hickory, oak, hard maple, beech, ash, birch and apple. Varieties of wood which equal three-quarters of a ton of coal to the cord are basswood, soft maple, chestnut, gray birch and poplar. A value of half a ton to the cord is

imputed to pine, aspen, hemlock, cedar, spruce and balsam.

The government is making every effort to prevent the creation in this country of fuel conditions such as those with which Europe is confronted. In a single day early in December Associated Press dispatches from London, Paris and Rome detailed the serious fuel problems in England, France and Italy. England has been forced to establish fuel rations based on a weekly allowance of 200 pounds for a four-room house. France has issued coal cards, with a limit of 264 pounds a month for families of four persons or less. In Italy heating has been suppressed except in public buildings and cooking is done with gas or charcoal. The coal supply of Italy is so short that during last summer more than 1,000 square miles of forests were cut down for use as fuel and for making charcoal.

Students of the situation in the United States agree that the use of wood is the sole solution of a fuel crisis which is constantly growing more acute.

BLACK LOCUST NEEDED FOR SHIPS

THE revival of the wooden-ship industry has occasioned a considerable demand for black locust wood for "treenails," which are used to fasten the planking to the ribs of the ship. Black locust originally occurred only along the Appalachian Mountains and on the adjacent highlands, from Pennsylvania to Georgia, but it has spread until it now is found in merchantable sizes over a large area. The wood is very hard and close grained and is one of the most durable hard woods known, particularly when in contact with the soil or in other moist situations.

In supplying black-locust wood for shipbuilding purposes it is very important, experts of the Forest Service say, to be able to distinguish it from that of the honey locust, a tree quite similar in many respects but whose wood has a coarser grain and is of inferior quality. The danger of selecting the wrong tree is increased by the fact that in some localities the names applied are exactly reversed, the honey locust being known exclusively as black locust and the true black locust being known as honey locust.

In the case of both trees the leaves are of the compound type, that is they are composed of a number of small leaflets arranged along the central leaf-stalk. The true black locust (which is known botanically as *Robinia*

pseudacacia) has leaflets with smooth or entire margins. The leaves of the honey locust (*Gleditsia trianthus*), however, are shallow-toothed or scalloped along the edges, particularly toward the ends.

The character of the thorns also furnishes a dependable means of identification. The thorns of the black locust are short and arranged in pairs. Those of the honey locust, on the other hand, are frequently several inches in length, are often divided into three or more branches, and may be produced in great quantities. They often occur in dense clusters along the main trunk of the tree. The seed pods are also distinctive. Those of the honey locust are, as a rule, from 10 to 18 inches long, while the pods of the black locust are shorter and usually measure from 2 to 4 inches.

To the experienced woodsman all of these features, of course, are very familiar, as is also the characteristic appearance of the black locust caused by the attacks of an insect known as the locust borer, which causes a characteristic swelling of the branches.

The officials of the Forest Service at Washington will identify specimens without charge. They point out that samples of leaves, twigs and fruits are always more dependable as a means of identification than the wood itself.

WHILE the studies of the value of the grazing privilege made this year have borne out the original position of the United States Forest Service that the fees formerly in force should be doubled, the present difficulties of the western livestock industry and the necessity for stimulating livestock production as a war measure have caused the Secretary of Agriculture to defer for the present any further increase in grazing fees, except

minor changes to correlate the fees between certain forests or groups of forests.

UNDER a contract with a film manufacturing company, the Department of Agriculture will supply motion pictures dealing with its activities, every two weeks. The first release was "The Work of a Forest Ranger."

PLANTS AND ANIMALS OF THE ATLANTIC AND GULF STATES

BY DR. R. W. SHUFELDT. C.M.Z.S.

FROM the Atlantic to the Pacific, all through the northern and middle tiers of states, there is very little flower collecting to be done during the month of December, while it is just the reverse in the case of those regions of the country bordering upon the Gulf of Mexico and the South Atlantic Ocean. In the latter area many plants, and some trees, are in full bloom; a long list of flowers are there to be studied, and, incidentally, not a few very interesting animals. When the country is covered with snow in the North, and the temperature rarely rises above the fifties, we never, as a matter of course, meet with any flowers, while occasionally we do run across various kinds of seed-pods, and sometimes remnants of plants, all of which are worthy of close observation and study.

As the holiday season comes on—war or no war—and the Christmas idea comes into the minds of the people, there is no plant or tree that appeals to us more forcibly than does the well-known American holly. A beautiful example of this is presented in Figure 1. Throughout the region where this tree or shrub grows—more particularly in the neighborhood of our cities—it seems to stand much in need of Federal protection, for the reason that the gatherers of its berried branches, in order to meet the demand of the market for it during the holiday season, have ruined and mutilated thousands of its kind. It

is a pitiful sight to observe the miserable, semi-limbless stumps of the holly in the fields, along the roadsides, and at the edges of some of our forests. This vandalism is carried on each year for miles about any one of our large northern cities.

Neltje Blanchan, who has searched out some of the ancient superstitions in regard to holly, very truly points out for us that “happily we continue to borrow all the beautiful Old World associations, poetical and legendary, that cluster about the holly at Christmas time, although our native tree furnishes most of our holiday decorations. As far back as Pliny’s day, the European holly had all manner of supernatural qualities attributed to it; its insignificant little flowers caused water to freeze, he tells us; because it was believed to repel lightning, the Romans planted it near their houses; and a branch of it thrown after any refractory animal, even if it did not hit him, would subdue him instantly, and cause him to lie down meekly beside the stick! Can it be that the Italian peasants, who still believe cattle kneel in their stalls at midnight on the anniversary of Jesus’ birth, decorate the mangers on Christmas Eve with holly, among other plants, because of a survival of this old pagan notion about its subduing effect on animals?”

The leaves of the American holly remain on the tree for three years; and we use the wood, which very closely



A RELIC OF THE PAST

Fig. 11—In the National Zoological Park, at Washington, we find many trees and animals well worthy of our closest study; later on, some of these will be referred to in greater detail. The rustic bridge here shown spanned one of the streams in that beautiful preserve. About a year ago it was replaced by a substantial stone one, so this picture is both historical and unique.

resembles ivory, for inlay work, tool handles, whip stocks and walking sticks. Engravers prize it very highly to engrave upon—an art now almost out of date; and it also has many other uses. This tree, that is, the American holly, will, within the next half century, be utterly extinct in the United States. Other hollies are the Yaupon, the Dahoon, the Swamp or Meadow holly, and the Mountain holly. In the Old World there are still different species of *Ilex*, and nearly all of them are fine and ornamental trees, worthy of far better protection than they now receive.

Far back into history the holly and the mistletoe are closely associated, in a decorative way, all through the holiday season, and many of the customs have come down to us.

"The mistletoe hung in the castle hall,
And the holly branch hung on the old oak wall;
The baron's retainers were blythe and gay
Keeping their Christmas holiday."

Holly trees transplant very successfully if proper precautions are taken, and a very beautiful species, with immense, red berries, is being introduced here from Japan. All the various kinds now to be found in the country should, at the suggestion of the American Forestry Association, be protected by both State and Federal Governments before it is too late to save them.

More than abundant all through the autumn, and often up to the arrival of winter, is the well-known little White Heath Aster (Figure 2), which looks for all the world like an extremely small edition of our common daisy of the meadows. It has also received the name of Michaelmas Daisy, White Rosemary, Farewell Summer, and Frostweed—because Jack Frost sometimes sees it in bloom. It rarely grows more than a yard high, and is sometimes so massed in favorable places that it appears, at a little distance, like some kind of a feathery inflorescence. Occasionally its little flowers are more or less strongly tinged with magenta or pale purple. The central discs are bright yellow, while the leaves of the plant are light green, minute, linear and heathlike, to become,



AMERICAN HOLLY, A TREE RAPIDLY DISAPPEARING IN SUBURBAN DISTRICTS

Fig. 1.—It is said that the generic name, *Ilex*, of this splendid tree is the ancient Latin name, originally applied to the Holy Oak; *opaca* is its specific name. Its drupes are of a brilliant red or vermilion color, while in some of the other hollies they are yellow.

near the base of the smooth stem, more lance-shaped and blunt; these latter may be minutely toothed or serrate.

In some parts of the country the bee-keepers have encouraged the spread of this tiny aster, for not only is it known to yield a large amount of nectar, but the latter is of a brand that our honey-bees are extremely fond of.

This miniature edition of the daisy may readily be identified by its very small and very rigid leaves. Last summer (1917) many of the early autumn flowers—this little Michaelmas daisy or aster among them—were ushered in with a flourish of trumpets, as it were, if one may be permitted to thus refer to the imaginary finale of the trumpet-flowers, as they drop out of the list of flowers that bloom in the northwestern sections of the country as September draws to a close.

Flowers of the Trumpet-creeper are among the most conspicuous of all those that are to be seen in the districts where the plant thrives, which includes, as a rule, the time extending from April to September, depending upon

the latitude where it is found. Those who have had the pleasure of seeing these great orange and scarlet flowers growing wild are not likely to ever forget the sight. Sometimes the vine may be massed over the great stone pier of a bridge at its initial anchorage, when hundreds of the flowers are in view at once. They stand out with especial prominence in the setting they receive from the luxuriant foliage of this great climber, its toothed and



HERE WE HAVE ONE OF THE LITTLE RAGAMUFFINS OF THE ROADSIDE

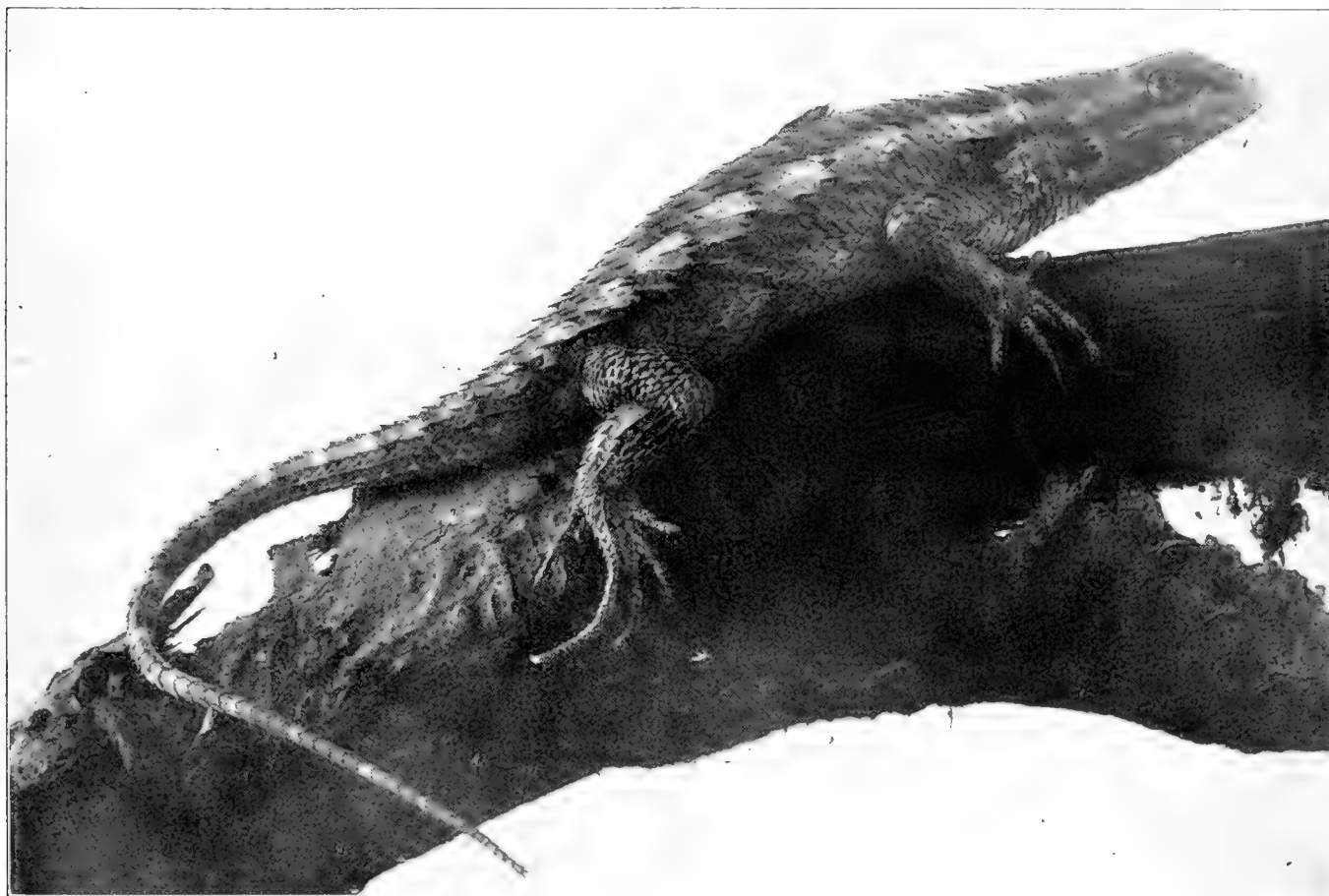
Fig. 2.—This tiny white aster is pretty generally known as the Michaelmas Daisy or Heath Aster (*Aster ericoides*). In the middle districts of its range, it sometimes blooms as late as November; it is a very abundant species as far south as Kentucky.

pointed leaflets being of a paler shade than the dark, shiny green, matured leaves, which are pinnate in outline and ovate in form. As will be noted in Figure 3, the flowers are corymbed, the brilliant corolla being funnel-formed, five-lobed, and somewhat irregular. The vine itself is woody, and climbs by means of its aerial rootlets. Its pods are well illustrated in Figure 4, where, too, may be seen some of the flattened, winged seeds. This flower is a great favorite with our Ruby-throated Humming-bird, and Audubon attempted to portray that spe-

cies hovering over a cluster of them. But the flowers bear but a very faint resemblance to specimens as they occur in nature, or as the camera has depicted them in Figure 3.

Our Trumpet-creeper belongs in the Bignonia family (*Bignoniaceae*), and has been named *Tecoma radicans*, it being the only representative of its genus in this part of the world. Associated with it in the same family we have the Catalpa or Indian Bean (*Catalpa speciosa*), also the sole species of its genus, though Gray tells us that there is "a low much branched tree, with thin bark and a smaller corolla," and so on, which by Thomas Walter has been designated as *Catalpa bignonioides*, and which is

localities, the well-known Virginia Ground Cherry, the highly attractive fruit of which, when ripe, is feasted upon by numerous species of birds of the region where it is found. Among the latter may be mentioned such species as our bluebirds and robins, and they, with others, love the places where this plant thrives best—on our hillsides, in pasture-lands, and on open ground generally. In describing this plant, F. Schuyler Mathews tells us that it is a "branching and erect-stemmed species, mostly smooth. The ovate, lance-shaped leaves, tapering toward both ends, very slightly shallow-toothed and light green. The flower dull pale yellow with five brown-purple spots; anthers deep yellow. The



SPINY SWIFTS, OR LIZARDS, MAKE INTERESTING PETS SOMETIMES

Fig. 7.—In the United States we have a genus of land lizards, to which the name of Swift has been given, for the reason that they can run with such astonishing rapidity. There are some fifteen species of them, and they all fall in the genus *Sceloporus*. They inhabit different ranges in different sections of the country, although several may occur in the same range. The one shown in the cut is one of the largest of the group, and has been called the Spiny Swift (*S. spinosus*) on account of the spiny character of its scales. It occurs in great numbers in Mexico, and from there it ranges northward and eastward from western Texas and New Mexico to western Florida. It has a length, when adult, of nearly ten inches

here defined as the Southern Cigar Tree or Southern Catawba Tree, to distinguish it from its northern relative. Finally we have in this *Bignonia* genus the Cross-vine (*B. capreolata*), a most interesting climber, which exhibits a "cross" on the surface exposed by a transverse section of its stem. It climbs up into trees, and flourishes in rich soil from Virginia to Florida, westward to include Ohio, Illinois and Louisiana. Most of the *Bignonias* have been cultivated as ornamental trees and vines and may frequently be seen in our gardens or on our estates.

From New York to Manitoba, and southward to the tier of states bounding the Gulf, we may meet, in suitable

stigma matures before the anthers, and extends beyond them. Fertilized by the honey-bee and the bees of the genus *Halictus*; *Halictus pectinatus* is a common visitor (Professor Robertson). The reddish berry enclosed within the enlarged calyx. One to three feet high." There is an insect that feeds upon the leaves of these plants and riddles them with fine perforations, but one of the most interesting things about it is the manner in which the calyx becomes skeletonized, admitting of a view of the fruit inside. When a large cluster of them has passed to this stage, it is certainly a very beautiful object, when held up to the sun in such a way as to observe the lighting up of the whole structure



THE FLOWERS OF THE SPANISH NEEDLES ARE SMALL AND HAVE YELLOW PETALS

Fig. 6—One of the plants in the eastern part of United States which do not shed all their seeds at once, frequently holding them until winter is about over. Many of these seeds stick to one's clothing, when one comes in contact with them in passing through places where they grow and so they are scattered far and wide. The plant is known as Spanish Needle (*Bidens bipinnata*). As a matter of fact, all of the *Bidens* group possess this very annoying clinging characteristic.

as the rays pass through them. These dried plants may sometimes be found in the fields after winter has set in and the ground is covered with an inch or more of snow. They are gentle encouragers as to the fact that the world has not seen its last summer, for when the joyous month of July comes round again in 1918 we shall still find our old friends, the Virginia Ground Cherries, adding their quota of interest and beauty to the flora of our pastures and meadow lands, with perhaps a few scattering plants higher up on the hillsides.

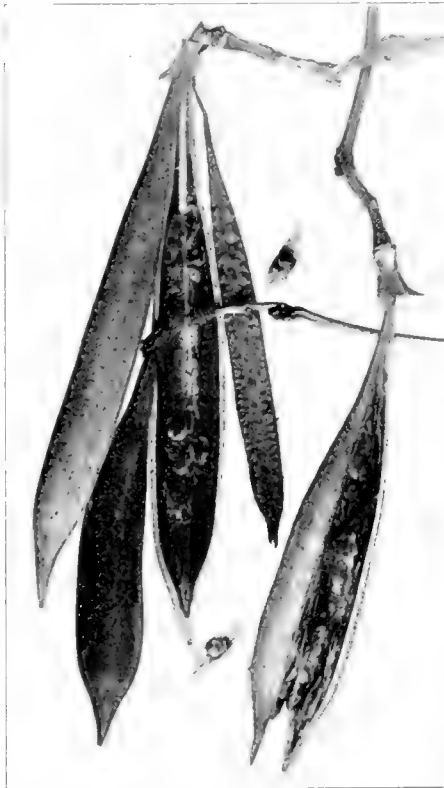
In those parts of the South which we have in mind, many of the smaller animals are in evidence all winter long, while during the same part of the year in the North they hibernate for several months at a time, and are never seen in the woods during the season that Jack Frost holds things in his icy grasp. For example, our beautiful little lizard, the common Swift, disappears just so soon as the really cold weather sets in, and we do not see him again until the bloodroots begin to think of peeping above ground. The male of this species is a beauty, with his glistening azure sides bordered with velvety black, and the bizarre pattern of brown that ornaments his back. From western Texas to Florida, his big cousin of the South (Figure 7), also prettily marked, gets a great deal more out of life than he does; for in the balmy southern regions he loses not an hour through being compelled to hibernate from early winter to the beginning of spring. He may be seen any day in December or January, in the forests of his range, comfortably sunning himself on some old log.

The various species of *Bidens* have practically all shed their seeds in the

North (Figure 6), while in many parts of the country, south of the Mason and Dixon line, the troublesome seeds of these noxious plants are abundantly in evidence. No one of the group is better known, either North or South, than our Spanish Needles—the brown seed needles of which are pretty thick and always double-pointed. These plants belong to the great Composite family (*Compositae*), along with a great many others of our most familiar flowers. In the *Bidens* genus there is even a Tickseed Sunflower, the seeds of which can stick to one's clothing with just as much tenacity as the seeds of the various species of Beggar-ticks in this array of pests of the autumn woods (*B. trichosperma*).

Many people have often wondered what the curious, spindle-shaped, little silken affairs, ornamented with bits of sticks or pine needles are, which are seen hanging from the twigs of many of our city shade trees, as well as from

not a few of the conifers in the forests, especially the red cedar and the arbor vitae. A good picture of one of these is here given in Figure 8, and it is the common "Bag-worm," a tree-pest of the first order. The larva feeds upon the leaves of many trees and shrubs, but ignores the sedges and grasses, and is most injurious. They can best be destroyed by collecting the cases in bags and baskets and burning them in a bonfire. Several years ago a great many bushels of them were thus collected in St. Louis and burned, with decided benefit to the city's shade trees the following summer. The late eminent economic entomologist, Prof. Charles Valentine Riley, gives an excellent account of this, with a life his-



PODS THAT HOLD THE FLAT, WINGED SEEDS OF THE TRUMPET FLOWER

Fig. 4—Long late in the autumn, the lengthy, deep tan-colored seed pods of the Trumpet flowers are to be seen, dangling from the leafless runners of the vine; from one to several in a bunch, quite a few hang onto the vine until winter is past. The rows of seed are separated by the fibrous division shown in the cut, where two winged seeds are seen falling out.



TREE CULTURISTS HAVE GIVEN THE "BAG WORM" VERY CLOSE STUDY

Fig. 8—A remarkable little moth (*Thyridopteryx ephemeraformis*) ranges from the Great Plains to the Atlantic Ocean, throughout the Appalachian subregion. Its life history is a very strange one, and much has been written upon it. Many shade trees and shrubs are victims of its voracious as well as promiscuous feeding habits; this is its cocoon.

tory of the insect. Dr. William J. Holland, in his "Moth Book," says: "The 'bag' or 'basket' of the male insect is smaller than that of the female. The males escape from the lower end of the case in the winged form, and having copulated with the females, which remain in their cases and are apterous and sluggish, die. The female deposits her eggs, which are soft and yellow, in the sack where she has her home, and ends her existence by leaving what little of her body remains after the ova have been extruded, as a sort of loose plug of dessicated tissue at the lower end of the sack. The eggs remain in the case till the following spring, when they hatch. The young larvae emerge, and placing themselves upon the leaves, where they walk about on their fore feet, with their anal extremities held up perpendicularly, proceed to construct about themselves little cones of vegetable matter mixed with fine silk. After a while they cease to hold these cones correct, and seizing the leaves and branches with their feet, allow the bag to assume a pendant position. They moult within their cases four times before reaching maturity and pupating." Sometimes hundreds of these little bags are seen to be suspended from the twigs of a single tree.

When the frosty nights of October come along, up through the Middle Atlantic and New England States, we have the annual and gorgeous display of the turning of the foliage of many of the different species of trees from the greens of summer and spring to the incomparable tints and shades of the reds, scarlets and yellows that



BADLY "STUNG," WITH THE STINGS PROVING FATAL

Fig. 10—Here we have a more complete example of the Virginia Creeper, with the same specimen of caterpillar shown in Figure 9. The latter has been fatally attacked by a female ichneumon fly, and the masses of white objects almost covering the unhappy victim are the larvae of the parasite. On the evening the caterpillar was collected, it appeared as in Figure 9; while next morning it presented the appearance so well shown here.



THE SCARLET LEAVES OF THE VIRGINIA CREEPER—ONCE SEEN WILL NEVER BE FORGOTTEN

Fig. 9—There is no more beautiful vine in all America than our Woodbine, or, as it is more generally known, Virginia Creeper. It has been called *Pseuderacanthus quinquefolia* of the Vine family (*Vitaceae*). Its generic name *Pseuderacanthus* is supposed to come from the Greek term *hedera*, given to the ivy. *Quinquefolia* refers to the leaf-arrangement of the five leaflets, so distinctly shown in the cut. The beautiful green caterpillar is the larva of one of our best Sphinx moths, the *Pholus satellitia pandorus*, a subspecies of the Satellite sphinx.

Mexico. Many will be familiar with the sight depicted with the camera in Figure 10 of this article. The unhappy larva has been attacked by one of our smallest thymenopterous parasites—a representative of the ichneumon family. The female of this insect, which is about the size of a mosquito, deposits her eggs upon the skin of the caterpillar. These soon hatch out, and the minute grubs work their way into the body of the victim, to feed upon the fat immediately beneath the skin. Later on, and previous to the maturing of the caterpillar, these grubs appear on the surface of the skin, and there weave the little silken cocoons so well shown in the reproduction of the photograph in Figure 10.

From these cocoons emerge the perfect insects, and the poor caterpillar invariably succumbs to the ordeal through which it has passed. The caterpillars of other species of our beautiful Sphinx moths suffer in a similar manner, and thousands of them perish thus every year.



FLOWERS OF THE GORGEOUS TRUMPET VINE

Fig. 3—There is no vine in America that presents a more striking appearance than our Trumpet-vine (*Tecoma radicans*). Abundant in northern Virginia, it has been introduced as an ornamental vine by many home-owners at the National Capital. In August its gorgeous vermilion flowers constitute one of the glories of the dusty roadside.

usher in the early months of autumn. Amidst this marvelous color-display there is a no more elegant participant than our Virginia Creeper, especially if the vine be a big one and has grown to exhibit its foliage to the best advantage. As these lines are written, the gray, pebble-dashed south wall of my home is overrun with such a vine, covering as it does many square yards. As the sun strikes it during the day, the thousands of scarlet leaves, intermingled with hundreds of bunches of small, round, bluish-black berries—the former all facing outwards—we are having presented to us a sight of peculiar beauty and magnificence—one of the chief glories of America's floral world. Darwin experimented with the tenacious hold of the tendril-disks of this vine, and other writers have had much to say about it. It grows luxuriantly in Cuba and even in northern

EDITORIAL

WASTE OF FORAGE THROUGH LACK OF GRAZING

THESE are days when conservation has come to be a grim reality. As never before the American people are striving to save in every way possible. Every natural resource is being made the most of and this is doubly true if it in any way affects our supply of food and clothing.

Much is being said, and very properly, about meatless days, reduction in the use of fats, use of more and heavier woolen clothing to save our coal, conserving our milk supply for the children, and the husbanding of our grains for use as human food.

The American people must produce all of the beef, mutton, wool, milk, cheese, butter and other animal products possible; and yet we must use in doing this the minimum of our valuable grains. This means that we should see to it that every scrap of our cheaper feeds is used in this production. Undoubtedly the cheapest of these feeds is to be found in our western range plants, especially that highly succulent forage, both herbaceous and shrubby, to be found in great abundance in the higher mountainous regions.

This range, in the northern Rocky Mountains, is not fully utilized. It has never been grazed to anything like its full carrying capacity and its waste without doubt constitutes one of our greatest economic leaks in the present crisis.

The forage of our wild lands is produced more cheaply than any other feed of like value. It simply grows without cultivation or care of any kind, and it does not have to be cut, hauled, etc., yet its real value is based, not on the cost of production, but on the amount and value of animal products it will produce when fully utilized by grazing. Never in the history of our country has the demand for animal products of all kinds been so great as at the present time, and yet the demand for grains for human food is so great that they should be used as sparingly as possible for the feeding of animals. It is, therefore, almost a crime to allow grass, if at all accessible, to go to waste when the country is in such dire need of what this forage will produce. The opinion is quite general that the range lands of the West are already fully utilized. This is true for certain portions of the range only. On many of the National Forests in northern Idaho, eastern Washington and western Montana the number of stock grazed is not half what the range can carry. Hundreds of thousands of acres of excellent forage in this region is wasting at the present time which should have been transformed during the past summer into meat and wool. When computed in pounds of food and clothing this loss is enormous and its value at present prices is indeed fabulous. Who is to blame for this state of affairs, and how is this waste to be stopped? No one is directly to blame, and the waste can be stopped only by education and development. The farmers and

stockmen of this region must be educated regarding the nature and value of this range, and the forests must be further developed with roads and stock trails in order that they may be more accessible for trailing herds and flocks in and out of these regions. The forest supervisors are doing this as rapidly as their limited funds will permit, they are also advertising this range and making its value known to stockmen by every means at their command. Yet they cannot get enough permittees to take up the allotments made and only a small part of the stock necessary to consume the forage which annually goes to waste. One of the chief difficulties lies in the fact that the farmers are as a rule inexperienced in trailing stock back into rough and mountainous country. If this range were in Utah, Arizona or California the veteran stockmen in these regions would soon get to it, and it would be fully utilized by these men who would at once recognize its value and eagerly grasp this opportunity for greater sheep and cattle production. Another reason why this range is not taken is because stock owners in the contiguous valleys do not fully understand the great advantage accruing from the formation of co-operative stock associations. In fact, many have never heard of these associations and know nothing at all of how they are operated.

One concrete example will serve to explain conditions obtaining on probably half the National Forests in the northern Rockies, some of which have had practically no grazing animals on them at any time. The forest referred to advertised to allot 12,000 sheep for the summer of 1917, the range being capable of carrying from 25 to 40 per cent more if permittees could be found. However, only 3,000 sheep were brought onto this range for the season. This means that but 25 per cent of the forage necessary to maintain at least 12,000 sheep with their lambs was used during the past grazing season. In other words, the forage necessary to maintain for three months 9,000 sheep with their lambs has been wasted. An investment in sheep of at least \$125,000 could thus have been maintained for one-fourth of the year and likewise its increase of from 5,000 to 6,000 lambs, worth at a conservative estimate from \$30,000 to \$35,000. A fair gain for the sheep for this period would be ten pounds per head and for the lambs thirty-five pounds per head, with two pounds of wool per head for sheep and lambs. This means that forage sufficient to produce 90,000 pounds of mutton and from 175,000 to 210,000 pounds of lamb or approximately 300,000 pounds of meat, and from 28,000 to 30,000 pounds of wool, both much needed at this time, is lost forever. The price at this time is so fabulous that the reader is left to determine the money value for himself. This is one of the smallest National Forests. Many of them in the region named could easily handle five times, and

some ten times this number of sheep, besides many cattle. Those in charge would gladly do this if people could be induced to provide the stock and to use the range. It is believed that many would do so were they fully informed of its real value, the methods of securing the range, and knew how to get the stock back to it. As said before, many have never heard of co-operative stock associations whereby the rancher with only a few head of stock may join with his neighbors, who also have small numbers, and together secure a range allotment for the season. In this way each man holds his stock in his own name, paying his share of the grazing fees and cost of herding. Many people do not realize how

far sheep and cattle may be trailed back into the mountains to excellent advantage. By this method the local ranges would be saved for spring and fall grazing. The opportunity given the close-in pastures for recuperation during the summer months would enable them to support a greater number of stock in the fall and spring, thus enabling the farmer or the stockman of the valleys to considerably increase the number of animals handled, add materially to his income and "do his bit" most substantially by way of augmenting the depleted supplies of our most highly valued classes of food products and clothing material. That this increase should be brought about is highly important.

WOOD CUTTING TO OVERCOME COAL SHORTAGE

THE serious shortage of coal throughout the entire country makes the substitution of wood for fuel a real necessity. How far increased use of wood can help this year is unknown. It appears, however, that the amount of fuel wood now cut and seasoned is far below normal, not more than one-half the usual supply. The small available supply of seasoned wood has caused the price to increase in many places to nearly double that of a year ago. Some towns in New England are reported as now paying as high as \$18.00 per cord for seasoned wood, while as high as \$12.00 per cord is paid in some places for wood f. o. b. These are unusual prices and were it not for the great scarcity of labor would undoubtedly greatly stimulate wood cutting wherever wood is available. Enormous quantities of standing timber suitable for fuel are available. The situation, therefore, demands prompt action not only to meet present exigencies, but to alleviate the situation a year hence.

The Federal Fuel Administrator for New England, Mr. J. J. Storrow, in a call to a conference on the subject, said:

"A serious shortage of coal threatens New England this winter. The situation does not warrant neglecting any possible measure of preparedness. For this reason it seems advisable to make a New England campaign for the production of wood on a large scale. Good hardwood properly prepared and dried can be used extensively for domestic purposes as an emergency measure. Wood cut in November can be burned the latter part of the winter, when the coal situation may be most acute. The campaign should also look ahead toward a large supply of wood for next winter when the coal situation may be more serious than this year."

The full attendance at the conference bespoke the interest of everyone in the solution of the fuel problem and conclusions reached were summarized as follows:

1. People throughout New England should be urged to use wood wherever they can do so in order to save coal.

2. It is earnestly recommended that the fuel administrators and the agricultural and other officers throughout the New England states shall urge upon all woodland owners to cut cordwood promptly and extensively.

3. As far as possible portable sawing machinery should be used in order to save the expense of additional handling. In some instances the wood can probably be cut into one foot lengths advantageously. The machinery uses a different class of laborers, reducing the number of skilled laborers required.

4. In order to secure the best results, local organization is necessary. Leadership and sometimes capital are required, which we believe should come from the local banks and business men.

5. It is recommended that the fuel administrator in each state shall appoint a representative committee from the several counties and wood-using industries, including the State Forester in each state, these committees to take charge of the wood situation under the fuel administrator. Insofar as their judgment approves, local committees in the several towns should be organized in order that the local committees shall protect themselves against extortionary prices.

The Fuel Administrators for each state should appoint committees in each town to canvass all timber land owners and urge upon them the necessity for increasing the cutting of wood not only to be used this winter but for a reserve supply of seasoned wood for next winter. Even where \$2.00 or even \$3.00 per cord is now paid for cutting the wood the owner is receiving more for his stumpage under present prices than he did a few years ago when cutting cost but \$1.00 per cord.

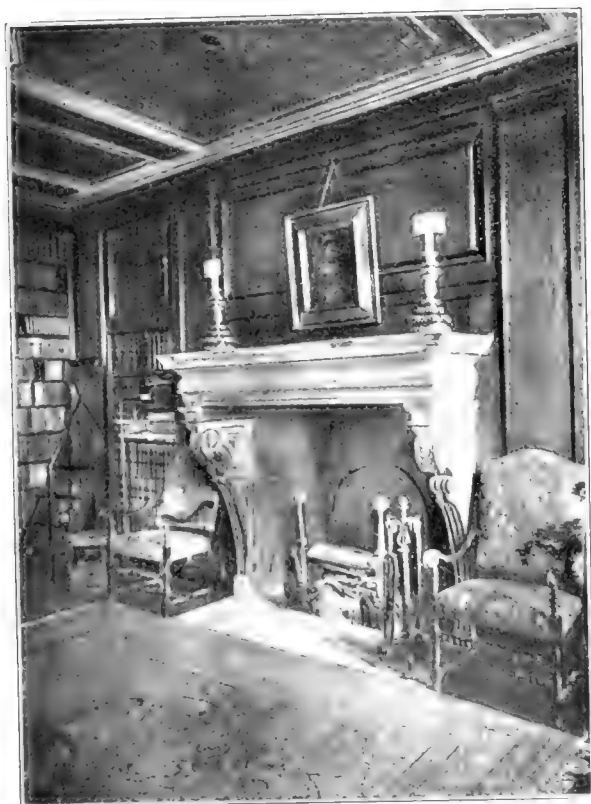
It is clear that woodland owners are, therefore, not being asked to make any financial sacrifices, but just to get a strong grip on the situation and use every effort with available labor to get out more fuel wood and then more during this winter. It must not be forgotten that the opportunity is big to improve our woodlands in this work. Let every reader of AMERICAN FORESTRY take hold and "do his bit" along this line.

THE municipal forest of Baden-Baden, Germany, yields an annual net profit of \$5.25 per acre. Many cities in the United States might have the same income. The town forest of Fosbach, Germany, pays a net profit of \$12.41 per acre per year.

A PAGE OF REMARKABLE FIREPLACES

AT LEFT—At Haddon Hall, Derbyshire, this old fireplace and the Old English Oak wainscoting is still in existence, though the drawing was made more than half a century ago. It was around fireplaces of this sort that the traditional Christmas of Old England grew. To mention those old celebrations suggests old oak-paneled rooms of this sort and we can hardly think of the rooms themselves without visions of glorious old holidays and the finest traditions of home life

BELOW—This Dutch kitchen dates from the seventeenth century and is in the Ancient Draperer's House, Leyden. Note the wooden shelf and hood and the tiled walls and floor.



ABOVE—This remarkably Italian looking room is in the residence of William G. Mather, Cleveland, Ohio, and was designed by Charles A. Platt, of New York.



AT RIGHT—The rooms in the Trianons are less elaborate than at Versailles. In this, the *Salon a Musique* at the Grand Trianon, the wooden paneling is painted putty color, and there is none of the gilding of ornament that was used so lavishly by Louis XV at Versailles.



USING WOOD IN FIREPLACES TO CONSERVE COAL

BY RAWSON W. HADDON

WHEN the year gets round to the time immediately before the day when

" . . . baby's hand just touches heaven
When Daddy lights the tree."

we begin to realize again how important the fireplace is to the final completion of our happiness when we are gathered for the most important holiday of all the year.

But for us, Christmas celebrations this year can hardly take on the lighthearted aspect that they have assumed in former years, though there never has been a Christmas for all the people of this country—unless perhaps it was that dark winter of Valley Forge—in which it was

should indicate an actual fact as well as a picturesque phrase.

It is announced that stringent measures are to be taken by the government for the conservation of the present coal supply, both mined and that which is now in the ground, for use in necessary government and public service establishments.

A single instance of this is the elimination of large and useless (and, from an esthetic viewpoint, most offensively ugly) electric advertising signs, with a resultant saving of hundreds of thousands of tons of coal for use in munition factories and other important industries.

But from this extreme case of hundreds and perhaps thousands of tons a day the duty of economy is distributed among other consumers and rests with equal importance upon the householder, in the use of whose supply of fuel it is also of the greatest importance that strictest economy and judgment be exercised.

At this point the forest is again called upon to do a part in carrying out the plans of the government, and one of the natural suggestions has been that fewer coal fires be used and that more attention be given to the heating of rooms by means of wood fires in open fireplaces. It is proposed that only a minimum temperature be maintained throughout the house and that extra heat, in living rooms for instance, as bed rooms seldom, if ever, need any large amount of heat, be obtained by the use of open fireplaces. Here, however, we must immediately realize the wastefulness of open coal fires and turn to wood for a satisfactory and economical fuel.

Quite outside of what may, with only a small amount of good natured exaggeration, be called the "aspect of military necessity" in this suggestion, fireplace heating has another and equally important point of view.

This is concerned with the fireplace, and the spark-



Photo courtesy Arthur Todhunter

We have our share of ups and downs,
Our cares like other folk;
The pocketbook is sometimes full,
We're sometimes well nigh broke;
But once a year, at Christmas time,
Our hearth is bright to see;
The baby's hand just touches heaven
When Daddy lights the tree

MARGARET E. SANGSTER

more important for us to realize and cherish and get every possible pleasant hour from our available stock of home atmosphere and home thoughts.

Nor have there been many times when it was so important to inspire those at the front with the assurance that we, at home, are keeping the "home fires burning" to welcome and cheer them when they return. And at this present time, there are good reasons why "the fires"



Photo by Frank Cousins.

Mantel in the Cook-Oliver House, Salem, Mass. Designed in 1799 by Samuel McIntire.

ling, crackling warmth of the open fire as one of the most important elements of the decoration of our homes.

To us of the present day, with all our improvements and labor-saving devices, which are all fine enough in themselves, but which are apt to lessen our consciousness of deeper grounded artistic longings and elements of life, the fireplace has, until very recently, been a neglected quantity.

Indeed we hear far too infrequently nowadays allusions to scenes where, as Robert Bloomfield, the cobbler-poet, said:

"Flat on the hearth the glowing embers lie,
And flames reflected dance in every eye;"

and too many contemporary American homes have been turned into enormously efficient but rather soulless habitations where the simpler, more graceful sort of ideals are all too easily lost sight of.

In building a fireplace there are many types to choose from. There are the large and elaborate sorts for instance, which were the product of calm and spacious days when magnificence in living was one of the arts of life, and which can be reproduced to advantage in very large and formal houses of the present time. Then, too, there are the simpler and more intimate and homelike products of our own Colonial days, which were built, originally, during a period when the



Living room in an old Colonial House that has been restored by an architect for his own use
Residence of Herbert M. Baer, Westport, Conn.

home fireside was the final goal of existence and when all social and national considerations revolved around it as a central point. Indeed, in all modern periods of history the fireplace has been developed as important an architectural feature as it has been a rallying point of social and family life.

In the earlier types the fireplace opening is extremely large, too enormous by far for present day use, but certain English and early American types are extremely well calculated for use today.

The design of the fireplace is, in fact, the one important keynote in the successfully decorated room. Much is gained, too, by building the fireplace into a paneled wall, as the majority of those illustrated are built.

In English houses the paneling is generally carried around four walls of the room, while in the American examples only one wall was paneled and the remaining ones were plastered or papered. This shows in the photograph which heads this article and the plastered side wall can be seen in the illustration of the living room of Mr. Baer's house.

In the design it is important that the use for which the room is intended be taken into consideration, and that it be in character and harmony with the room and with the furnishing to be placed in it.

Roughly speaking, there are three general types of fireplace which are used at the present time. An example of the most elaborate type is found in Georgian work such as that in the drawing room at Belton, of which an interesting reproduction has been carried out by the Hayden Company of New York, and reproduced through their courtesy.

The structural work in this room is built of English oak and the elaborate wood carvings executed in old pear wood. The mantel itself, as in the original, is executed in marble as a contrast to the large amount of woodwork otherwise used. In finishing the wood it was thoroughly stained, and waxed to bring out its fine nat-



Photo courtesy of the Hayden Co.

A reproduction of an old English paneled room of most elaborate design.
The paneling is oak and the carvings in old pear wood.

ural color. In this English type the fireplace opening is in itself rather small in comparison to the scope of the whole design. A very much stronger and more definite note is struck by the picture and carving over the mantel which are, in themselves, important and necessary parts of the composition, making the mantel frame and the "over mantel" together form the entire and distinct feature of design.

In the fireplace and paneling in Mr. Baer's house, on the other hand, an entirely different scheme, and different theory of design is found. In this latter type the overmantel is subordinated in importance to a large and ample fireplace opening. In this case it will be noted that no decoration whatever is found in the place occupied by the picture and the carving in the Belton example, and the fire opening is in this way emphasized and made the important element of design. This emphasis upon the opening itself is further accentuated by the absence of any mantel shelf and the use of a single bold and emphatically simple molded frame. This is a good example of early Colonial work and illustrates a type of wall treatment that deserves the careful and earnest consideration of the home builder of today.

"The paneling shown in this room," writes the architect, "was taken out of an old house of about the same period as that of my own residence and dates, approximately, from the year 1750. It was delivered at my house in absolutely original condition, and, as antique buyers say, 'in the rough.' Built of local pine, it had in the course of years received coat upon coat of paint, some good and some of extremely poor quality. Much of this had been chipped off and in order to finish the woodwork properly after it was set up in the room, it was necessary to burn off a large part of this paint and to carefully scrape off the remainder. After this, the woodwork was given two and then three coats of paint which I selected as being without any doubt the best for the purpose. Finally a coat of flat enamel was applied. The importance of the selection of proper paint cannot be over-emphasized. Between each coat, to make a good job, the paint should be properly sandpapered."

The last of the three types occupies a middling course between the two extremes already discussed and is found illustrated in the mantels most frequently found in later Colonial and English work and which may be illustrated by the mantel heading this article and by an interesting one in Salem, designed by Samuel McIntire and erected in 1799. This latter type is more often used than the earlier Colonial one and perhaps is justly the more popular scheme. Certainly it fits better in the unpaneled room and it suggests a cer-

tain informality and homelikeness which, though making its use impossible in the formally arranged or decorated room, makes its use advisable in a far greater number of conditions than is possible in the case of either of the previous types.

While the Salem example is an authentic antique and probably built, also, of some local wood, the illustration which appears over the verse on the first page is quite modern in erection, but is an exact reproduction of an old mantel now in the possession of Mr. Arthur Todhunter, of New York city, who has done much to further art appreciation in the home by the many splendid products of his business. Such mantels and fireplace furnishings from well designed antique models are within the reach of every house builder at a cost very often far smaller than would be necessary for the purchase of considerably inferior designs elsewhere.

It will be noted that this third type of mantel is designed quite independently of the surrounding wall. And while it is found both in paneled and in plastered rooms it has no more actual decorative relation to one than to the other. While the first type, to be successful, must be designed with an equally important overmantel, and the second type derives its entire success from the absence of the same, and loses much of its effectiveness if the space above it is not left severely unornamented. The space over this third type is left to be decorated as the house furnisher wishes. An old pictorial paper makes decorations impossible in the Salem example, but the other illustration shows the scope left to personal taste in the matter of mirrors and mantel shelf decorations.

The structural materials selected for the work, and the manner in which these are finished is important. When the decorative scheme calls for woods left in rich natural colors materials must be selected with care both with regard to their color and wearing qualities. In recent work many interesting results have been obtained with practically every domestic wood. Much work could be illustrated in which results of the greatest interest and merit have been obtained in the use of American oak, red gum, walnut, cypress and many others. For work which is to be finished with heavy coats of paint or enamel (which must be selected with care and in the light of the conditions that maintain in the paint market at the present day) the favorites seem to be, to name only a few, pine, spruce, maple, cypress and others.

And finally, when all is said and done and we have had our artistic appreciation and all the homelike coziness that an open fire will give, we need in no wise look upon our enjoyment as a selfish extravagance or

a self indulgence, but rather as a sacrifice that our brothers and fathers may thereby be furnished with those things that will assure for them safety and some degree of comfort and a final happy issue out of this present great conflict in which they, in far distant lands, are fighting so bravely and so unselfishly for the protection of our homes and of the lives of those who are dearest to them—and to us.

In itself the contribution to the grand total seems a pitiful and an insignificant one, but it so happens that from our seemingly unimportant economy in this one particular, and from our saving of coal that follows as a result of this use of wood fires, we have a positive assurance that we are making possible the production of materials for the final and complete crushing of that hideous and monstrous and almost unspeakably degraded and cruel enemy that comes to our very doors threatening our lives and menacing the continuance of our best traditions and those ideals for the establishment of which our forefathers laid down their lives long years ago.

Those who are now at the front, and those who will soon be there, will be most in your thoughts this Christmas Day and they will be glad to know that you at home are helping in all, even in these apparently unimportant ways.

Through all the long months that they must spend on foreign soil and during which they must contend with the necessary privations of war, it will inspire them to greater and nobler efforts to know that you are comfortably established at home, out of the way of harm, and keeping up those traditions and conditions to which they hope, after their final, glorious victory, to return.

And, in doing this, in lighting your fireplace, you have the satisfaction of knowing that every wood fire, every additional cord of wood and every ton of coal saved in home use means almost untold protection to your soldiers in the form of the possible additional production of ammunition for their use. Every cloud of smoke ascending from our chimneys, where it comes from a wood fire, means just so much fuel saved to prevent the ghastly conditions caused by a shortage of ammunition that brought about those horrible catastrophes in Russia—and more recently on the Italian front.

Victorious advances will require far more munitions than defensive campaigns and in the future as victories increase the need of straining every energy to supply these munitions will be necessary. You, the government knows, will assist in this by using less and less coal at this time and by substituting for it comfortable fires of wood. A small sacrifice, surely, even at its very worst, for so good a cause.

AMERICAN FORESTERS IN MILITARY SERVICE

This list is compiled from various sources. Every effort has been made to make it complete and accurate, but in the nature of things there are necessarily omissions and errors. The list will be reprinted and increased from month to month. All foresters and others who can supply additional names or note corrections are urged to communicate with American Forestry as promptly as possible, to the end that the list may have full value as a record of the men who have gone to war.

- A**GEE, Fred. B., Deputy Forest Supervisor, U. S. F. S.
 Albano, Jack, forest ranger, U. S. F. S.
 Aldous, Tura M., grazing, U. S. F. S.
 Alexander, Ben, (Bilt. For. School), 2nd R. O. T. C.
 Alexander, J. B., 1st Lt. Aviation Corps, (Uni. of Wash., '17).
 Allen, Raymond, New Jersey.
 Ames, F. E. (Yale For. School '05).
 Anderson, A. C., 2nd Lt. U. S. A. (Uni. of Wash., '17).
 Anderson, Emil A., deputy forest supervisor, U. S. F. S.
 Archer, Frank L., forest clerk, U. S. F. S.
 Armstrong, Carroll W. (Bilt. For. School) Quartermaster's Dept., Fort Dodge.
 Armstrong, Ralph H. (Bilt. For. School), 104th Inf., Expeditionary Forces, France.
 Atkinson, E. S., (Yale For. School, '16).
 Atwood, C. R. (Univ. of Maine, '15), manager, Unit 1, New England Sawmill Units.
 Avery, B. F., commissioned in Eng. (Forest) forces; (Yale For. School); Spanish River Pulp and Paper Mills.
 Aylward, F. N. (Univ. of Calif.), Ambulance Corps.
- B**ADERTSCHER, Ed., temporary clerk, U. S. F. S.
 Baker, Hugh P. (Yale For. School, '04), N. Y. State Col. of Forestry.
 Baldenburg, Max B., clerk, U. S. F. S.
 Barker, S. Omar, Co. D., 502nd Service Bn., Camp Merritt, N. J. U. S. F. S.
 Barlow, Harold (Yale For. School, '14).
 Barr, John B., forest ranger, U. S. F. S.
 Barton, Robert M., 20th Engineers (Forest), American University, Wash., D. C.; forest ranger, U. S. F. S.
 Bastian, Clyde E., Corp. 20th Eng. (Forest), (Uni. of Mich., '16).
 Batten, R. W. (Yale For. School, '16).
 Beaman, Clarence W., messenger, U. S. F. S.
 Beattie, Homer Milo (Mich. Univ., '01), sergt. 10th Engineers (Forest).
 Bedwell, Jesse L., forest ranger, U. S. F. S.
 Behre, C. Edward, 20th Engineers (Forest), American University, Wash., D. C., U. S. F. S.
 Bell, George R. (Yale For. School, '18).
 Bellue, A., 10th Engineers (Forest).
 Benedict, M. S., 1st Lt. 10th Eng. (Forest), for. sup., U. S. F. S.
 Benedict, Raymond E., Major 10th Eng. (Forest), For. Br. B. C.
 Bentley, George A., Capt. Quartermaster's Dept., purchasing agent U. S. F. S.
 Bennett, Edwin L., forest ranger, U. S. F. S.
 Bennett, William W., Co. E. 31st Ammunition Train, Camp Funston, Ft. Riley, Kansas, U. S. F. S.
 Bernhardt, Carl L., (Uni. of Wash., '18).
 Berry, John K., scaler, U. S. F. S.
 Berry, Swift, forester, U. S. F. S.
 Betts, Fred. H., forest ranger, U. S. F. S.
 Bevan, Arthur (Uni. of Wash., '17).
 Billingslea, James H., Jr., Top Sergeant (Uni. of Wash., '14), forest ranger, U. S. F. S.
 Bird, R. L., Corp. 20th Eng. (Forest), (Cornell, '16).
 Bird, Vern A., forest ranger, U. S. F. S.
 Bloom, Adolph, Ensign U. S. N. Train. Sta. (Uni. of Wash., '16).
 Bonney, Parker S., Sub. Lt. British Navy (Uni. of Wash., '13).
 Bosworth, James H., 20th Engineers (Forest), American Univ., Wash., D. C., U. S. F. S.
 Bowen, John S., 20th Engineers (Forest), American Univ., Wash., D. C., U. S. F. S.
 Bowen, Jos. B. (Yale For. School, '17).
 Bradley, Tom O. (Mt. Alto), Pa. Dept. For.
 Brady, Charles C. (Uni. of Wash., '18).
 Brady, Seth C., messenger, U. S. F. S.
 Breneman, Howard E. (Mt. Alto For. Acad., '17), Co. C., 10th Eng. (Forest), Pa. Dept. For.
 Brewster, Donald R., forest examiner, U. S. F. S.
 Brickerhoff, H. E. (Yale For. School), 1st Lt. Inf.
 Brindley, Ralph, 2nd Lt. R. O. T. C. (Uni. of Wash., '17).
 Brockway, M. (Univ. of Me., '15), checker, Ten Saw Mill Units.
 Brooks, James F., forest ranger, U. S. F. S.
 Brown, Bascom H., forest ranger, U. S. F. S.
 Brown, R. A., Co. D., 23d Engineers, Camp Meade, Md., U. S. F. S.
 Brown, Vance, scaler, U. S. F. S.
 Browning, Harold A., asst. forest ranger, U. S. F. S.
- Broxon, Donald (Uni. of Wash., '14).
 Bruce, Donald, Prof. of For., Uni. of Cal. (Yale For. School, '10; assigned in charge of timber reconnaissance in France.
 Bryant, Edward S., Capt. 10th Eng. (Forest), for. ins., U. S. F. S.
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 Bunker, Page (Yale), city forester, Fitchburg.
 Burgess, John, surveyor draftsman, U. S. F. S.
 Burnham, R. P. (Uni. of Wash., '17).
 Buttrick, P. L., Amer. Ambulance Serv. (Yale For. School, '11).
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 Calloway, G. A. (Uni. of Mo.).
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 Calvert, Gerald F. (Uni. of Wash.).
 Cameron, J. F. (Uni. of Wash., '19).
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 Carpenter, Herbert M. (Bilt. For. School), 20th Eng. (Forest).
 Cappel, Frederick, forest clerk, U. S. F. S.
 Cassidy, Hugh O., forest ranger, U. S. F. S.
 Cecil, Kirk P., surveyor, U. S. F. S.
 Chudderlon, Harold A., forest ranger, U. S. F. S.
 Chamberlain, Harry A., forest ranger, U. S. F. S.
 Chapman, Charles S., Major 10th Eng. (Forest), (Yale For. School, '02), forestry assistant, U. S. F. S.
 Chartrand, Lee F., 20th Eng. (Forest), forest ranger, U. S. F. S.
 Charlson, Alex., (Uni. of Wash., '16).
 Christensen, Alfred C., forest clerk, U. S. F. S.
 Clark, Donald H., 1st Lt. R. O. T. C. (Uni. of Wash., '17).
 Clark, E. V., 1st Lieut.; R. O. T. C., forest supervisor, U. S. F. S.
 Clemmons, Walter C., forest ranger, U. S. F. S.
 Colledge, Edward W. (Bilt. For. School), Am. Ambulance Service, France.
 Colburn, H. C., 10th Eng. (Forest), Co. B., Expeditionary Forces, France, U. S. F. S.
 Condon, H. R., 2nd Lt. 10th Eng. (Forest), Pa. R. R. forester.
 Conklin, J., 20th Eng. (Forest).
 Conklin, W. Gardiner, 1st Lt. 20th Eng. (Forest), (Pa. State For. Acad., '08), Pa. Dept. Forestry.
 Cook, A. M. (Yale For. School, '08).
 Cook, John W., clerk, U. S. F. S.
 Cook, G. D. (Mich. Agri. College), 1st sergt. 10th Eng. (Forest).
 Cook, H. O., Capt., 2nd Forest Regiment, Massachusetts.
 Cook, Samuel, forest ranger, U. S. F. S.
 Cookston, Roy, Capt. 10th Eng. (Forest).
 Coolidge, Lieut. Joseph (Harvard, '12), 20th Eng. (Forest), consulting forester.
 Copsey, C. N., 10th Eng. (Forest).
 Cope, H. Norton, forest ranger, U. S. F. S.
 Cowan, T. DeWitt, 20th Engineers (Forest), American Univ., Wash., D. C., U. S. F. S.
 Cowman, Tahnadge D., forest ranger, U. S. F. S.
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 Crumb, Isaac J. (Uni. of Wash., '20).
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 Culley, Matthew J., forest ranger, U. S. F. S.
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 Dorrance, John Gordon (Biltmore, '10), 2nd. Lt. E. O. R. C., Md. State Board of Forestry.
 Dorward, D. L. (Yale For. School, '14).
 Douglass, C. W. H., Aviation Corps (N. Y. State Col. of Forestry, '15), American Forestry.
 DuBois, Coert, Major 10th Eng. (Forest), dis. forester, U. S. F. S.
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 Dunbar, Roger S. (Bilt.), 20th Eng. (Forest).
 Dunn, Beverly C., Adjutant 10th Eng. (Forest).
 Dunning, Duncan, forest assistant, U. S. F. S.
 Dunning, Earle (Bilt.), Quartermaster's Dept.
 Dunston, Clarence R., 1st. Lt., U. S. Indian Service.
 Dunwoody, Capt. W. Brock (Yale, '16), 3rd Field Art., Ft. Myer, Va., 2nd Asst. State Forester Va.

ELDREDGE, Inman F., Capt. 10th Eng. (Forest), forest supervisor, U. S. F. S.
 Elliott, Harry R., forest ranger, U. S. F. S.
 Eddy, Ben, 23rd (Highway) Engineers, U. S. F. S.
 Egnor, James W., McCormack State Park, Indiana.
 Elliott, F. A., 10th Eng. (Forest).
 Ellis, Ralph T., woodsman, Ten Sawmill Units (Mass For. Dept.).
 Emerick, Lloyd P., forest clerk, U. S. F. S.
 Emerson, Fred D. (Bilt.), Camp Dix.
 Emerson, J. Ward, forest ranger, U. S. F. S.
 Estill, Davis H. (Bilt.), corporal, Inf.
 Euchern, Wm. H. (Bilt.), 20th Eng. (Forest).
 Evans, Vincent (Uni. of Wash., '16).
 Everett, E. W., 20th Eng. (Forest).
 Ewing, Robert B., forest ranger, U. S. F. S.

FAIRCHILD, Rollin A., forest clerk, U. S. F. S.
 Flier, Charles (Uni. of Wash., '20).
 Fish, Harold (Uni. of Wash., '18).
 Fisher, David (Uni. of Wash., '14).
 Foerster, M. H., 41st Co., 11th Bat., Camp Zachary Taylor, Louisville, Ky.
 Foess, Jacob E., 20th Eng. (Forest), (Mich. Ag. Col., '17).
 Foley, A. C., Corp. 20th Eng. (Forest), (Uni. of Mich., '18).
 Foran, Harold (Uni. of Wash., '16).
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 Fowler, Frederick H., district engineer, U. S. F. S.
 Frankland, James, forest ranger, U. S. F. S.
 Fritchle, C. R. (Uni. of Mo.).
 Fritz, Emanuel (Yale For. School, '14), forest asst., U. S. F. S.
 Freedman, Lieut. Louis J. (Harvard), Eng. Corps (Forest).
 Frey, E. (Cornell, '17), 10th Eng. (Forest).
 Fullenwider, William G. (Bilt.), 10th Eng. (Forest).
 Fuller, Francis S., forest assistant, U. S. F. S.

GALER, George E., forest ranger, U. S. F. S.
 Gallaher, W. H., 2nd Lt. (Yale For. School, '10), U. S. F. S.
 Garrett, C. B. (Uni. of Wash., '16).
 Gaylord, Donald (Yale For. School, '15).
 Gearhardt, Paul H., Battery E., 316 Rg., H. F. A., Camp Jackson, S. C.
 Geary, H. O., 20th Eng. (Forest).
 Gebo, L. W., 20th Eng. (Forest), (Cornell, '16).
 Gibbons, William H., 2nd. Lt., forest examiner, U. S. F. S.
 Gill, Thomas H. (Yale For. School, '15), forest ranger, U. S. F. S.
 Gilman, John, forest ranger, U. S. F. S.
 Gilson, R. M. (Yale For. School, '17).
 Girk, Royal J., forest clerk, U. S. F. S.
 Given, J. Bonbright, 1st Lt., Camp Jackson, S. C.
 Godwin, D. P., 1st Lt. 10th Eng. (Forest), forest exam., U. S. F. S.
 Gooch, Winslow L., 10th Engineers (Forest), American Exped. Forces, France, U. S. F. S.
 Goodman, Walter F., forest ranger, U. S. F. S.
 Gowen, Geo. B., Coast Artillery.
 Graham, Paul (Uni. of Wash., '13).
 Granger, C. M., assistant district forester, U. S. F. S.
 Graves, Henry S., Lt. Col., director, division of forestry headquarters, American Expeditionary forces; United States Forester.
 Greathouse, Ray Livingston, Co. A., 362 Infantry, Camp Lewis, American Lake, Washington, U. S. F. S.
 Greeley, William B., Major, deputy director, division of forestry headquarters, American Expeditionary forces; assistant United States Forester.
 Grefe, Raymond F., forest ranger, U. S. F. S.
 Grinnel, Henry (Bilt.), Forest Regiment.
 Guthrie, John D. (Yale For. School, '06), forest sup., U. S. F. S.

Guthrie, Richard T., forest examiner, U. S. F. S.
 Gwin, Clyde M., Camp Lewis, American Lake, Tacoma, Washington, U. S. F. S.

HAASIS, F. W., (Yale For. School, '13), Regular Army, Medical Dept.
 Hackett, William, forest ranger, U. S. F. S.
 Hagon, Jules L., 20th Engineers (Forest), for. ranger, U. S. F. S.
 Hall, A. F., 20th Engineers (Forest).
 Hall, F. B., woodsman, Ten Saw Mill Units, Mass. Dept. of For.
 Hall, R. C. (Yale For. School, '08), forest examiner, U. S. F. S.; assigned to timber reconnaissance in France.
 Hall, Stanley B. (Harvard, '09).
 Hammer, George C., Neopit Indian Mills, Neopit, Wis.
 Hammond, Charles P. (Biltmore), 20th Engineers (Forest).
 Hansen, Harvey L. (Univ. of Calif.), Ambulance Corps.
 Hansen, Thorvald (Yale For. School, '17), forest asst., U. S. F. S.
 Hansson, Arnold (Yale For. School, '17).
 Harding, Charles C. (Yale For. School, '16).
 Harlachner, Josef (Mt. Alto, '17) 20th Eng. (Forest), 1st Bat., Pa. Dept. For.
 Harley, Percy H., forest clerk, U. S. F. S.
 Harrington, Neal (Mich. For. School, '12), Company G., 341 Inf., Camp Grant, Rockford, Ill.
 Harmelling, H. (Uni. of Wash., '12).
 Harris, Alvin E., 20th Engineers (Forest), American University, Wash., D. C., U. S. F. S.
 Hendrickson, Guy C., forest clerk, U. S. F. S.
 Hendrix, Albert W., forest ranger, U. S. F. S.
 Hicock, Henry W. (Yale For. School, '15).
 Hicks, L. E., forest ranger, U. S. F. S.
 Hill, F. C., forest ranger, U. S. F. S.
 Hill, Rollin C., 10th Engineers (Forest), American Exped. Forces, France, U. S. F. S.
 Hilliard, L. E., woodsman, Ten Saw Mill Units, England; Mass. For. Dept.
 Hirst, E. C. (Yale For. School, '09), state for., New Hampshire.
 Hogentoler, Joseph R. (Mt. Alto, '12), with Governor's troops, Pa., Pa. Dept. For.
 Holt, Felix R. (Yale For. School, '02).
 Honeycutt, E. E., 20th Engineers (Forest).
 Hotze, E. B. (Uni. of Mo.).
 Hope, L. S. (Yale For. School, '16).
 Hout, William E. (Mt. Alto, '09), 20th Eng. (Forest), formerly Pa. Dept. For.
 Houtz, Jesse (Mt. Alto, '13), Field Artillery, Camp Meade, Md., formerly Pa. Dept. For.
 Huff, Rolland, forest ranger, U. S. F. S.
 Hull, J. H. (Yale For. School, '11).
 Humphrey, J. C. H. (Yale For. School, '09).
 Hussey, Ralph W., forest ranger, U. S. F. S.

INGALLS, E. E. (Yale For. School, '17).
 Inskeep, Raymond P., forest ranger, U. S. F. S.
 Isola, Vico C. (Yale For. School, '11).
 Irwin, James A. (Mt. Alto, '12), Sergt., 10th Eng. (Forest), France, formerly Pa. Dept. For.

JANOUGH, Karl L., forest ranger, U. S. F. S.
 Johnson, O. S., Sgt. 20th Eng. (Forest) (Uni. of Minn., '16).
 Jones, E. F., forest examiner, U. S. F. S.
 Johns, Walter Ridgley, 158 Co., 35 Battalion, 166th Depot Brigade, Camp Lewis, American Lake, Washington, U. S. F. S.
 Johnson, F. W. (student, Ohio State), 10th Engineers (Forest).
 Jones, Luther G. (Yale For. School, '16).
 Judson, Luchard (Yale For. School, '17).

KELLEY, Evan W., Capt. 10th Eng. (Forest), forest examiner, U. S. F. S.
 Ketcham, Louis, forest ranger, U. S. F. S.
 Kaestner, H. J., Forester of West Virginia.
 Kelley, Capt. Arthur L. (Colo. Ag. Col.), 19th Co., Inf., O. R. C.
 Kenny, John, woodsman, Ten Saw Mill Units, Mass. For. Dept.
 Kephart, G. S. (Cornell, '17), 10th Eng. (Forest).
 Keyes, John H., 20th Eng. (Forest), (Yale, '14).
 Kettridge, John C., forest examiner, U. S. F. S.
 Kiefer, Francis, Capt. E. O. R. C., asst. dist. forester, U. S. F. S.
 Kilmer, William F. (Biltmore), Co. B., Signal Corps, Camp Sheridan, Ala.
 Kimball, George W., forest examiner, U. S. F. S.
 King, Robert F., 2nd. Lt. Coast Artillery (Uni. of Wash., '19).
 Kingsley, Ray M., forest ranger, U. S. F. S.
 Kittredge, Joseph, Jr., forest examiner, U. S. F. S.
 Klobucher, F. J. (Yale For. School, '16), forest ranger, U. S. F. S.
 Knowlton, H. N., engineer in forest products, U. S. F. S.
 Kobbe, William H. (Yale For. School, '04).
 Koomey, L. H. (Yale For. School, '12).
 Kraebel, Charles J., forest assistant, U. S. F. S.
 Kraft, F. G. (Uni. of Mo.).

Krause, John E., forest ranger, U. S. F. S.
 Krell, Frederick C. (Penn State, '13), sergt. 1st class, 10th Eng. (Forest), Asst. Forester Pennsylvania Railroad.
 Krueger, Myron E., 20th Engineers (Forest), forest ranger, U. S. F. S.

LAFON, John, Capt. 10th Eng. (Forest), Forest Branch B. C. Langville, H. D., Major 505th Serv. Regt.
 Larzon, Arthur K. (Uni. of Wash.).
 Lee, Chester A. (Yale For. School, '17).
 Leach, Walter (Mt. Alto, '14), 314th Inf., Camp Meade, Md., Pa. Dept. For.
 Lentz, Gustav H. (Yale For. School, '17), Sergt., 10th Eng. (Forest).
 Lewis, Ferry D., forest ranger, U. S. F. S.
 Lindsey, Eugene L., 1st Lt. 10th Eng. (Forest), (Yale For. School, '19), forest examiner, U. S. F. S.
 Littlefield, Theron R., forest ranger, U. S. F. S.
 Lockwood, Milton K. (Biltmore), 1st Lt., Camp Jackson, S. C.
 Loud, William D., 20th Eng. (Forest).
 Loveman, A. M. (Yale For. School, '16).
 Lowdermilk, Walter C., 10th Engineers (Forest), American Exped. Forces, France, U. S. F. S.
 Lundgren, Leonard, Captain, engineer, U. S. F. S.
 Luther, T. F., 20th Eng. (Forest), (Cornell, '17).

MACKECHNIE, A. R., 2nd Lt. U. S. A. (Uni. of Wash., '18).
 Malmstein, Harry E., grazing assistant, U. S. F. S.
 Marckworth, Gordon D. (Yale For. School, '17), 20th Eng. (Forest), Va. State For. Dept.
 Marsh, A. Fletcher (Yale For. School, '11).
 Masch, Walter (Mt. Alto), 20th Eng. (Forest), Pa. Dept. For.
 Marston, Charles O. (Biltmore), 10th Engineers (Forest).
 Marston, Capt. Roy L. (Yale), 103rd U. S. Inf., Co. E, France.
 Mason, David T., Capt. 10th Eng. (Forest), Uni. of Cal. (Yale For. School, '07).
 McCullough, Thomas E. (Yale For. School, '11).
 McGillicuddy, Blaine (Uni. of Wash.).
 McGlaughlin, Eugene R., 20th Eng. (Forest), (Ohio State Uni.).
 McKnight, Roscoe, 1st Lt. 10th Eng. (Forest), U. S. F. S.
 McNulty, L. Edgar (Mt. Alto For. Acad., '17), Co. C., 10th Eng. (Forest), Pa. Dept. For.
 McPherson, Benj. D. (Mt. Alto For. Acad., '16), 10th Eng. (Forest), Pa. Dept. For.
 Meek, Chas. R. (Mt. Alto, '12), 20th Eng. (Forest), Co. A., 3rd Bat., Pa. Dept. For.
 Meloney, Henry M., 20th Eng. (Forest), forest ranger, U. S. F. S.
 Mendenhall, Fred D., surveyor-draftsman, U. S. F. S.
 Mershon, William B. (Biltmore, '10), 10th Eng. (Forest), sergt. 1st class.
 Mesch, Walter (student at Mont Alto), 20th Engineers (Forest).
 Meschke, Karl G., 20th Eng. (Forest), forest assistant, U. S. F. S.
 Meyer, L. A., 10th Eng. (Forest).
 Meyer, Leo W. (Yale For. School, '17).
 Middour, Joseph C. (Mt. Alto For. Acad., '16), Co. C., 10th Eng. (Forest), Pa. Dept. For.
 Miles, Clark, forest examiner, U. S. F. S.
 Millar, W. N., Capt. 10th Eng. (Forest), (Yale For. School, '08).
 Miller, Edwin B. (Mt. Alto For. Acad., '17), 10th Eng. (Forest), France, Pa. Dept. For.
 Miller, Fred H., forest ranger, U. S. F. S.
 Minner, Clifford R., forest ranger, U. S. F. S.
 Modisette, W. M. (Biltmore), 1st Lt. U. S. Cavalry.
 Moir, W. Stuart (Yale For. School, '17).
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 Montgomery, Ray C., forest ranger, U. S. F. S.
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 Moody, Capt. F. B., Engineer Officers' Reserve Corps.
 Moore, Barrington, Capt. (Yale For. School, '08), U. S. F. S.
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 Morton, J. Newton (Mt. Alto For. Acad., '16), Co. C., 10th Eng. (Forest), Pa. Dept. For.
 Mosch, Walter (Mt. Alto) 20th Eng. (Forest), Pa. Dept. For.
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 Murphy, E. C., 2nd Lt., U. S. A. (Uni. of Wash., '20).
 Murphy, R. A. (Yale For. School, '17).
 Mutz, George, forest ranger, U. S. F. S.
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 Myers, Edgar (Cornell, '17), 10th Engineers (Forest).
 Myers, Reynolds V. (Biltmore), senior non. 10th Eng. (Forest).

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 Odell, W. T. (Uni. of Wash., '12).
 Oliver, J. Earl, forest ranger, U. S. F. S.
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 Orr, Ronald H., 20th Eng. (Forest), (Biltmore For. School, '09).
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PAEETH, William J. (Yale For. School, '12), forest assistant, U. S. F. S.
 Paine, F. R. (Yale For. School, '14).
 Pagter, Lawrence B., 20th Engineers, forest examiner, U. S. F. S.
 Paine, Topliff O., forest ranger, U. S. F. S.
 Partridge, Herbert E. (Biltmore).
 Paxton, Percy J. (Yale For. School, '09), forest exam., U. S. F. S.
 Peabody, Joseph, 20th Eng. (Massachusetts For. Dept.).
 Peck, Allen S., Major, 10th Eng., '09, forest insp., U. S. F. S.
 Peck, E. C. (Yale For. School, '18).
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 Perry, Jr., R. E. (Cornell, '17), 10th Engineers (Forest).
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 Plummer, Donald (Uni. of Wash., '20).
 Port, Harold F. (Mt. Alto For. Acad., '16), Co. A., 10th Eng. (Forest), France, Pa. Dept. For.
 Porter, O. M. (Yale For. School, '15).
 Powell, Harry A., British Army, (Uni. of Wash.).
 Powers, James E. (Mt. Alto, '15), Artillery, Pa. Dept. For.
 Powers, Victor S. (Uni. of Wash., '18).
 Prichard, R. P. (Yale For. School, '09).
 Prince, Edmund H., 2nd Lt. National Army.
 Pryse, E. Morgan, forest assistant, U. S. F. S.

QUINLAN, James, woodsman, Ten Saw Mill Units (Mass. Forestry Dept.)

RAINSFORD, W. K. (Yale For. School, '06).
 Ramsdell, Willett F., deputy forest supervisor, U. S. F. S.
 Rase, Frederick W., surveyor, U. S. F. S.
 Rand, E. A., 1st Sgt., 20th Eng. (Forest), (Uni. of Me., '14).
 Riblett, Carl H., forest ranger, U. S. F. S.
 Rice, A. M., 20th Engineers (Forest).
 Richards, E. C. M. (Yale For. School, '11).
 Ricketts, Howard B., clerk, U. S. F. S.
 Ridings, Troy G., 10th Engineers (Forest), American Exped. Forces, France, U. S. F. S.
 Ringland, Arthur C., Capt. 10th Eng. (Forest), (Yale For. School, '05), forest inspector, U. S. F. S.
 Rixson, C. L., forest clerk, U. S. F. S.
 Roberts, Wesley K. (Uni. of Wash., '18).
 Robertson, Colin C. (Yale For. School, '07).
 Robinson, S. E. (Yale For. School, '12).
 Robison, L. E., (Yale), 10th Engineers.
 Rockey, K. E. (Yale For. School, '12).
 Roeser, Jacob, Jr., forest assistant, U. S. F. S.
 Root, Lloyd (Mt. Alto For. Acad., '17), Co. C., 10th Eng. (Forest), France, Pa. Dept. For.
 Ross, R. M. (Bilt., '09), Forest Regiment.
 Rowland, Arthur L. (Mt. Alto), Pa. Dept. For.
 Rowland, Horace B., Jr. (Mt. Alto For. Acad., '15), Co. F., 10th Eng. (Forest), France, Pa. Dept. For.
 Rush, William M., forest ranger, U. S. F. S.
 Russell, Austin P., forest ranger, U. S. F. S.
 Russell, Joseph P. (Uni. of Wash.).
 Russell, William L., 20th Engineers, forest ranger, U. S. F. S.
 Ryerson, K. A., 10th Engineers (Forest).

SADLER, George M., forest ranger, U. S. F. S.
 Salton, Robert C., forest ranger, U. S. F. S.
 Sanford, E. C., 1st Lt., 10th Eng. (Forest), forest supervisor, U. S. F. S.
 Sanger, Owen J., 1st Lt. Canadian Contingent (Uni. of Wash.)
 Schmaelzle, Karl I. (Uni. of Wash.).
 Schmitz, Henry (Uni. of Wash., '15).
 Schoeller, J. Diehl (Uni. of Wash.), 1st Lt. Cavalry, Inf. School of Arms, Fort Sill, Oklahoma.

Schowe, William A., forest ranger, U. S. F. S.
 Scofield, William L. (Yale For. School, '13), for. rang., U. S. F. S.
 Segur, Lewis L., forest ranger, U. S. F. S.
 Seltzer, J. W., 1st Lt. (Pa. State For. Acad., '09), 10th Eng. (Forest), France, forester N. J. Zinc Co.
 Senft, Walter M. (Mt. Alto), Pa. Dept. For.
 Severance, H. M., New York National Guard.
 Shaefel, Oscar F., 10th Engineers (Forest) American Exped. Forces, France.
 Sharron, John L., Ten Saw Mill Units, Mass. Forestry Dept.
 Sheeler, George W. (Mt. Alto, '12), Co. C., 502d Service Bat., Pa. Dept. For.
 Shepard, H. B., 2nd Lt., 10th Eng. (Forest), forester Lincoln Pulp Co.
 Shepard, Robert, 20th Engineers (Forest), American Univ., Wash., D. C., U. S. F. S.
 Shenefelt, Ira Lee (Mt. Alto, '16), Co. C., 502d Service Bat., Pa. Dept. For.
 Siggins, Howard W. (Mt. Alto For. Acad., '14), Co. C., 10th Eng (Forest), Pa. Dept. For.
 Silcox, F. A. (Yale For. School, '05), district forester, U. S. F. S.
 Simons, S. T., 25th Eng., Camp Devens, Ayer, Mass., U. S. F. S.
 Skeels, Dorr, Capt., 10th Eng. (Forest), Uni. of Montana.
 Slonaker, L. V., 10th Engineers (Forest), American Exped. Forces, France, U. S. F. S.
 Smith, A. Oakley (Yale For. School, '14).
 Smith, Edwin F., forest ranger, U. S. F. S.
 Smith, E. H., 1st Lt. 316th Inf., Pa. State Forestry Dept.
 Smith, Edward S. (Mt. Alto, '16), Nat. Army, Camp Meade; Pa. Dept. For.
 Smith, H. A. (Mt. Alto, '16), Field Hospital Ser., Fort Benj. Harrison, Indianapolis, Ind.; Pa. Dept. For.
 Stadden, Robert W. (Mt. Alto, '14), 20th Eng. (Forest), Pa. Dept. For.
 Speers, Vincent E., forest clerk, U. S. F. S.
 Speidel, H. A. (Yale For. School, '11).
 Staebner, R. C.; eng., Little River Lumber Co., Townsend, Tenn.
 Stanton, L. G. (Uni. of Wash., '18).
 Steer, Henry B. (Cornell, '15), 10th Eng. (Forest), U. S. Indian Service.
 Stevens, Carl M. (Yale For. School, '12).
 Stewart, Clifford H., forest ranger, U. S. F. S.
 Stewart, Jefferson M., clerk, U. S. F. S.
 Stone, Everett B. (Yale For. School, '17).
 Stuart, R. Y., Capt., forest inspector, U. S. F. S.
 Stults, Hal L., forest ranger, U. S. F. S.
 Stutz, Jerome H. (Biltmore), 10th Engineers (Forest)
 Swapp, Roy, forest ranger, U. S. F. S.
 Sweeney, Joseph A., forest ranger, U. S. F. S.
 Sweeney, Michael J., forest examiner, U. S. F. S.

TARDY, Albert (Biltmore), New England Saw Mill Units
 Taylor, G. M., 2nd Lieut. (Cornell, '17).
 Taylor, L. W. (Uni. of Calif.), 20th Engineers (Forest).
 Thomas, F. H., 10th Engineers (Forest), American Exped. Forces France, U. S. F. S.
 Thomas, Harry L., Co. C., 10th Eng. (Forest), for. rang., Pa. Dept. For.
 Thomas, John, 10th Eng. (Forest), France, for. rang., Pa. Dept. For.
 Thompson, D. C. 2nd Lieut. (Cornell, '17)
 Thompson, Jackson (Uni. of Wash., '16).
 Thompson, Raymond H., forest ranger, U. S. F. S.
 Tilson, Howard, 2nd Lieut. (Cornell, '17)

APPROXIMATELY 1,500 fires occurred in the National Forests of California during the past season. They were suppressed at a cost of \$100,000. One hundred and fifty of these fires could be classified as severe. Between fifteen and eighteen thousand acres of timberlands were burned over.

IN order to speed up the getting of men, supplies and equipment to forest fires, Supervisor Erickson, of the Crater National Forest, uses an auto truck into which are loaded not only men and outfit, but also pack animals and equipment. After going as far as possible by auto the outfit is packed on the burros to the place it is needed.

Tommasson, Thos., 10th Engineers (Forest), American Exped. Forces, France, U. S. F. S.
 Turner, F., 2nd Lt. (Univ. of Calif.).
 Tweedy, Temple (Yale For. School, '14).

VAN WICKLE, J. M. (Uni. of Wash.).
 Van Arsdall, Howard (Mt. Alto), Pa. Dept. For.
 Voight, Alfred W., forest ranger, U. S. F. S.
 VanHorn, Harry E. (Mt. Alto For. Acad., '14), Co. A., 10th Eng (Forest), France, Pa. Dept. For.
 Van Riper, C. A., 20th Engineers (Forest).
 Verge, Fred, woodsman, Ten Saw Mill Units (Mass For. Dept.).

WAGNER, G. C., Jr. (Yale For. School, '18)
 Walsh, Harry A., Capt. Quartermaster's Dept., U. S. F. S.
 Ward, Herbert S., clerk, U. S. F. S.
 Walter, Roy Irving (Biltmore), Camp Jackson, S. C.
 Warren, Avra M., 2nd Lt. National Army, 1st Battalion, 310th Infantry, Camp Dix, N. J.
 Warren, M. C. (Uni. of Cal.), 10th Engineers (Forest).
 Waters, Louis H., 20th Engineers (Forest), American Univ., Wash., D. C., U. S. F. S.
 Webb, Walter R., Asst. Engineer in Forest Products, Radio Serv.
 Weitknecht, Robert H., forest assistant, U. S. F. S.
 Welby, Harry H. (Biltmore), 10th Engineers (Forest).
 Wells, Arthur B. (Mt. Alto, '11), 18th Machine Gun Co., Fort Ethan Allen, Vt., Pa. Dept. For.
 Wentling, Floyd, 10th Engineers (Forest), state forest warden.
 Westfeldt, W. O. (Yale For. School, '16).
 White, Martin E., forest ranger, U. S. F. S.
 White, William E., forest examiner, U. S. F. S.
 Wieslander, A. E., 20th Engineers (Forest).
 Wilcox, J. M., Corporal Inf. (Uni. of Wash., '20).
 Wilder, Raymond T., Private 20th Engineers (Forest), Mass For. Dept.
 Williams, Hubert C., 1st Lt. 10th Eng. (Forest), (Yale, '08).
 Wilson, Stanley F. (Yale For. School, '14), for. rang., U. S. F. S.
 Wirt, William (Uni. of Wash., '18).
 Wise, Lloyd (Ohio State, '17).
 Wisner, —, Corp. 20th Eng. (Forest), (Syracuse, '17).
 Withington, George T. (Biltmore), New England Saw Mill Units.
 Wohlbund, E. F., 2nd Lt., 10th Eng. (Forest), forest examiner, U. S. F. S.
 Wold, Henry, Ordnance School, Eugene, Oregon, U. S. F. S.
 Wolfe, Kenneth, forest ranger, U. S. F. S.
 Wolfe, Stanley L., 1st Lt., U. S. F. S.
 Woolsey, Theodore S., Jr. (Yale, '02); major 10th Eng. (Forest), Amer. Expeditionary Forces, France.
 Woodruff, James A., Lt. Col. 10th Eng. (Forest).
 Woods, J. B., 1st Lt. 10th Eng. (Forest).
 Work, Herman, 1st Lt. 10th Eng. (Forest), deputy forest supervisor, U. S. F. S.
 Wulff, Johannes (Yale For. School, '17).
 Wycoff, Garnett (Ohio State, '13), 10th Engineers.

YEOMANS, E. J. (Yale For. School, '12), for. rang., U. S. F. S.
 Young, L. P., 2d Lt. Inf. (Uni. of Wash., '17).
 Young, Douglas E., private English army, killed in France April 10, 1917 (state forest warden, Maryland).
 Youngs, Lieut. Homer S., 16th U. S. Infantry, care of Adjutant General, War Dept., Washington, D. C., U. S. F. S.

ZELLER, R. A., forest assistant, U. S. F. S.
 Zieger, Robert H., forest ranger, U. S. F. S.
 Ziegler, E. A., Capt. Coast Art., Direc. Pa. State For. Acad.

THE ANNUAL MEETING

AS a measure of wartime conservation it has been decided by the Board of Directors to dispense with the usual form of annual meeting of the American Forestry Association in January. Instead, a formal meeting without addresses or discussions will be held at the offices of the Association on Wednesday, January 9, at 10 A. M. in order to comply with the bylaws. When the war is over and the forestry regiments return from abroad a big meeting will be held to discuss war time forestry developments.

ONE of the most expensive woods used in America is boxwood. It sells for about \$1,500 per 1,000 board feet.

RUGGED BEAR'S BREAST PEAK

BY GUY E. MITCHELL

IN our school geographies the Cascade Mountains receive but passing notice, as a small part of the Pacific Coast mountain system of the United States. As a matter of fact, the Cascade Range, extending from northern California northward through Oregon and Washington, form a tremendous and majestic forest-clad barrier of thousands of square miles, cutting off the Pacific Ocean

from the arid plains and valleys of the interior, and surmounted at frequent intervals by some of the most stupendous extinct volcanoes of the continent. The peaks and ridges rise high above the great Cascade plateau, which in ages past has been uplifted to an altitude above the sea of nearly 5,000 feet. The whole land is volcanic, the outflow from a multitude of vents, which in a remote period of the earth's history poured out countless thousands of billions of tons of lava and scoria. Out of these mountains, many of

them snow-clad through the greater part or even the entire year, come the rivers which, winding through the high valleys and augmented by many brooks and larger tributaries, constitute the great, strong running streams which feed the fertile irrigated lands to the east, or tumble down the more precipitate slopes to the west and produce a water power sufficient to turn the wheels of

a thousand industries—one of the great and only slightly developed resources of America.

The photograph shows a typical mass of volcanic origin, one of the giant mountain peaks of the Cascade range, unheard of by more than one in ten thousand people outside of its immediate vicinity, a type of hundreds of other similar high peaks, but one of exceptional

beauty and ruggedness. It is not, however, as might be supposed, an extinct volcano; it is a mountain left by erosion, not built up by eruptions. This peak, known as Bear's Breast Peak, is at the head of the middle fork of the Snoqualmie River. Its altitude is 9,200 feet above sea level and its highest 2,000 feet rises above timber line, bare and rugged.

A severe test of mountaineering is the climbing of Bear's Breast Peak. What appear in the photograph to be but rough places are in fact impassable cliffs and rents in the rock, up or across which



BEAR'S BREAST PEAK IN THE CASCADE MOUNTAINS

This is one of the most beautiful of the mountains of the Pacific Coast range, the view from the summit of which well repays the strenuous effort of him who climbs to the top.

no man can pass; yet once attained the view from the summit of the peak is incomparably fine, the grand chaos of the great Cascade range and plateau stretching away as far as the eye can see—100 miles or more in the intensely clear western atmosphere. The lower slopes of the mountains are richly clothed with heavy forests of majestic firs from 150 to 250 feet in height

CANADIAN DEPARTMENT

ELLWOOD WILSON, SECRETARY.

CANADIAN SOCIETY OF
FOREST ENGINEERS

It is axiomatic that a man has a right to do what he likes with his own property. This right has been curtailed to the extent that the use a man makes of his property shall not injure the public or his neighbor. A man owning a tree may cut it down, but he must see that it does not fall on his neighbor's fence or house or otherwise damage his property. Further than this the Government has decreed that it has the right to protect a watershed of a navigable stream or of the water supply of a city by preventing the cutting of timber which would injure it. The State of New York has taken the position that a man may not cut his timber and leave his slash in such condition as to be a menace to other timber lands. Will not the time soon come, when realizing the long time element in the growing of timber and the fact that it takes more than one generation to grow a merchantable tree, the State will hold that no timber owner shall have the right to cut his timber without making adequate provision for its replacement, in time, except in the case of agricultural land where total clearing is a necessity. The case in the example of government-owned lands on which cutting rights are leased or sold is fairly clear, but is it a very great extension of the principle to ask that every man who comes into possession of timber land and wishes to use it as such, should be compelled to plant a tree for everyone he cuts. There is only one objection to such a policy from the selfish standpoint of the owner, and that is the cost. But here, just as in the case of private property taken for public ends, the general community should be willing to pay the ultimate cost by paying the enhanced price of the timber caused by the expense of replacing it for the future. As Professor Toumey has so well said, the question of replanting, in the very essence of things, is a matter for the public, and it should bear some part of the cost. Let the timber owner take the responsibility of replanting and let the community foot the bill, in increased timber prices.

The value of preparedness has been splendidly demonstrated in Canada. For the past few years the Commission of Conservation has been making an inventory of the kinds and location of timber in British Columbia. This past month the Government wanted to know where to get spruce for airplanes. Applying to the Commission, they were told at once, not only where to get it, but there was a man ready to show them. Mr. Craig, who has been in charge of this work, was immediately attached to the Imperial Munitions Board and will look after this work. The Commission is pressing for an inventory of tim-

ber in Ontario and Quebec and it is hoped that the work will commence next summer.

The preliminary report of the Commission on the condition of cut-over pulpwood lands, and the prospects of a future crop, has been made by Dr. Howe, of the University of Toronto. It is very interesting and significant. The lands in question are, like practically all forests from which pulpwood is cut, covered with mixed stands of spruce, balsam and hardwood. At first only the spruce was cut, then the loggers went back and took off smaller spruce and an increasing amount of balsam, and on the last cut nearly 78 per cent of balsam was taken to 22 per cent of spruce. Such cutting, of course, favors the growth of hardwoods and leaves them predominant in the stand, overshadowing and suppressing the young spruce and balsam left. It is shown that, under these conditions existing on the lands, it takes 40 years for the little spruce trees to grow one inch in diameter, 100 years to make a six-inch tree and 150 years to reach the minimum diameter of 12 inches established by the cutting regulations in Quebec. Balsam grows somewhat faster. One inch in diameter is reached in about 16 years and seven inches at about 70 years. These statements refer to the time required to make a merchantable forest from the seedling stage onward. There are on the average 30 spruce and 59 balsam trees per acre from four to eight inches in diameter already present. These will furnish another crop in time, but the time is long. The growth tables show that it will require about 70 years for the four-inch trees and about 50 years for the eight-inch trees to reach the 12-inch diameter limit. The larger balsam, however, will be merchantable in 10 years. There are only six spruce and six balsam trees over eight inches diameter on the average acre. This number is too small to justify exploitation alone, so that the next cutting must be delayed until a sufficient number of the smaller trees reach a merchantable size. On these heavily culled lands it will probably be found that henceforward a period of from 30 to 60 years must elapse between cuttings, if only spruce and balsam are to be removed. Unless the hardwoods are to be removed and thus give the soft woods a chance, it will prove cheaper and more expeditious to plant trees, rather than to wait for the next cut furnished by nature.

The report of the St. Maurice Forest Protective Association for 1917 is in and shows that a total of 4,367 acres were burned over this summer, only 287 acres of which were in merchantable timber. Cut-over areas and old burns showed 2,272 and 1,592 acres respectively, again demonstrating the fact that cut-over land is the worst hazard and the land which most needs protection. This cannot be efficiently given until some system of slash disposal is put in force. The cost of extinguishing fires by extra labor has dropped from \$13,001 in 1914 to \$1,050 this year, showing very forcibly that most of our fires were extin-

guished in their incipency by the rangers. The causes of fires were as follows:

Railways	122
Section Men.....	4
Unknown	38
Construction Work.....	26
Drivers	5
Dam Builders..	8
Fishermen	8
Settlers	4
Jobbers	2
Total.....	217

The forest survey of New Brunswick is making good progress under Director G. H. Prince. Nine hundred and twenty-five thousand acres have been mapped this year, making a total of 1,200,000 acres since the start of the survey, or about 16 per cent. of the total area of Crown land in the province. The Forestry Department will co-operate in the scaling and logging inspection this winter.

H. R. MacMillan has gone with Canadian Aeroplanes, Ltd., a branch of the Imperial Munitions Board, to take charge of procuring spruce for airplanes.

The secretary of the Canadian Forestry Association is making a lecture tour through the Province of New Brunswick. He is having large audiences and much interest is shown in his work.

In Alberta the Dominion Forest Service has built about 20 miles of telephone line and carried on its program of trail building. Four of the Alberta men are reported as having joined the "Boys at the Front" lately. In the Crowsnest Pass a fire occurred during the past summer which cost \$4,500 to extinguish. R. H. Roberts, assistant to Inspector Gatches, is going overseas with the 20th U. S. Engineers (Forest). Prof. W. N. Millar, late of the University of Toronto, is with the 10th U. S. Engineers (Forest), which is officered and largely manned by United States Forest Service men.

A bulletin has been published in Australia giving the details of the investigations of Mr. D. W. Paterson into the paper pulp situation, and his recommendations. He recommended that spruce and poplar should be planted in the high altitudes of Victoria in proximity to water powers available for pulp mills. He said that spruce could be first cut for pulp after 15 years and that 900 acres would supply the needs of Australia for one year. His advice was that 2,000 acres be planted the first year and 1,000 acres yearly after that until the first planted trees were ready for cutting. After an area is cut it is to be replanted and thus a continuous supply of timber insured, as it is not economical to cut pulpwood from mixed forests and that only pure stands will pay. Mr. Paterson's estimate is that the profit realized after 15 years, including interest on capital and all costs, other than payment for the land, provided cheap water power was available, would be \$120 per acre.

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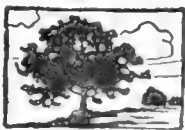
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BOOK REVIEWS

Stories which will appeal to children of all races and climes appear in a book just issued by the American Book Company, New York, Cincinnati and Chicago. Under the title "Stories the Iroquois Tell Their Children," Miss Mabel Powers has collected and given the world thirty or more tales of genuine charm. They are divided into two classifications, Iroquois wonder stories and Iroquois fairy stories. Miss Powers has been adopted by the Senecas and is known as Yeh sen noh wehs. The book has a foreword of approval signed by the chiefs of the six tribes.

Hundreds of commodities are listed in the new issue of "Du Pont Products," just issued by E. I. du Pont de Nemours & Company. The book shows that this manufacturing concern and its subsidiary companies have undergone an enormous expansion since the beginning of the war. Particularly interesting is the expansion in the line of chemicals, made necessary by the inability of this country to import many of the chemicals essential to various branches of industry. Many of the commodities listed have not before been made in America. The book may be had by applying to the offices of the company at Wilmington, Delaware.

Foods and Household Management; a Textbook of the Household Arts, by Helen Kinne, professor, and Anna M. Cooley, associate professor, of Household Arts Education, Teachers' College, Columbia University. The Mac-Millan Company, New York. Price \$1.10.

For use in high schools and normal schools this book offers a valuable adjunct to the course in household arts. In its preparation due regard was had for its use in the home as well. The contents include a treatment of the cost and purchasing of foodstuffs, the management of the home and other questions vital to the economy and health of the household. Specific treatment is accorded foods, their production, sanitation, cost, nutritive value, preparation and serving. The work includes approximately 160 carefully selected recipes and a large number of cooking exercises of more experimental nature, designed to develop initiative and resourcefulness. The book is practical and economical.

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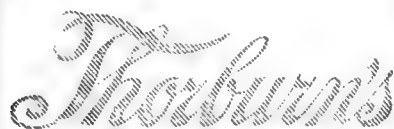
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The Forests of Maryland, by State Forester F. W. Besley. The Maryland State Board of Forestry, Baltimore.

Information useful to the forest owner, the timber buyer, the manufacturer and the student is embraced in the book just issued by State Forester F. W. Besley for the Maryland State Board of Forestry. The report is based on an accurate and complete inventory of the forest resources of the state and contains separate forest maps for each county. The purpose of the book is to show in condensed form and orderly manner the state's forest wealth, its value to the people, and how the resources may be best conserved by wise use for supplying present needs and the needs of the future. Of the total land area of 6,330,000 acres Maryland has a woodland acreage of 2,228,000, or 35 per cent. The book is interesting and of practical value.

Relation of Birds to Forests.

The Indiana State Board of Forestry, in order to encourage the protection of birds and study their relation to forest life, is offering prizes to the pupils of schools for the best essay on the "Relation of Birds to Indiana Forests." For the best essay from the seventh and eighth grades, respectively, a prize of \$5 will be given. For the best essay from each of the high school classes a prize of \$7.50 will be given. The offer is extended to all schools doing work equivalent to the grade and high schools.

The essay must not exceed 2,000 words and must be mailed to the Secretary, State Board of Forestry, not later than May 15 1918. It is suggested that pupils who expect to enter the contest write for the rules governing the contest.

Birds of America (Nature Lover's Library). The University Society, Inc., New York. 3 volumes, price \$29.50 a set.

As a contribution to the literature of America this is a notable work. The aim of its compilers was to present a complete review of the available knowledge concerning birds. The fundamental factor in the undertaking was a realization that the task of preparing a comprehensive account of the bird life of the continent is too great to be accomplished in a lifetime by any individual working alone. Co-operation on the part of many authorities was deemed essential and the array of talent represented in the list of compilers is an indication of the scale of the enterprise. The editor-in-chief was T. Gilbert Pearson, of the National Association of Audubon Societies. John Burroughs was consulting editor; George Gladden managing editor and J. Ellis Burdick associate editor. The special contributors were Edward H. Forbush, state ornithologist of Massachusetts; Herbert K. Job, ornithologist for the Audubon Societies; William L. Finley, state biologist for Oregon, and L. Nelson Nichols, member of the Linnaean Society.

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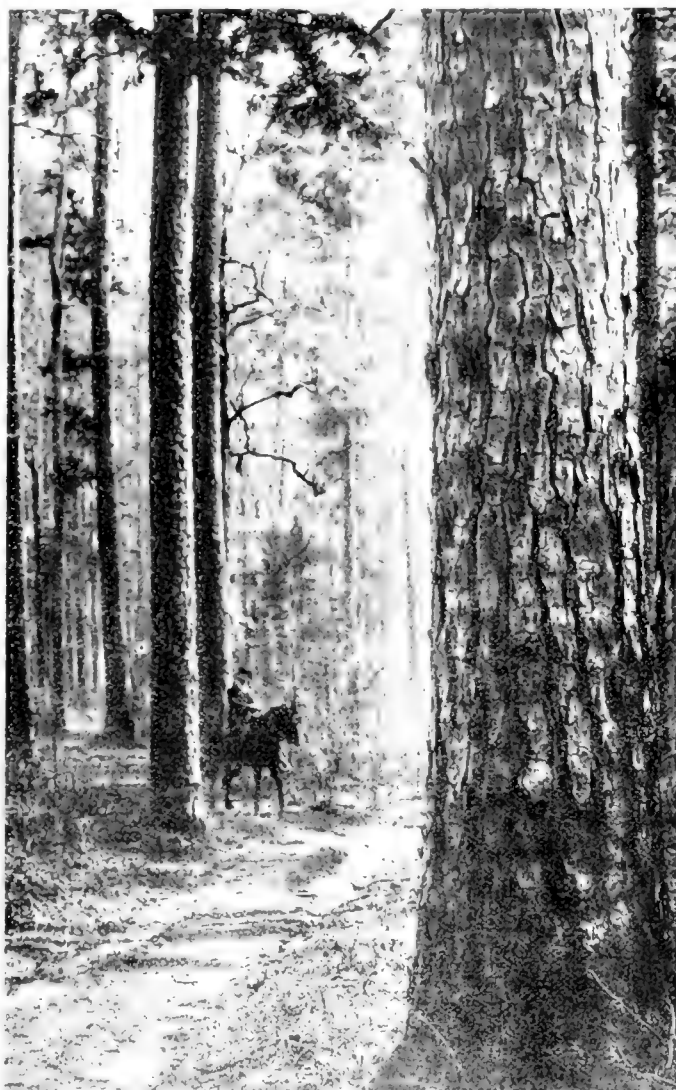
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DISTRICT FORESTER
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Declaration of Principles and Policy of The American Forestry Association

IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT forestry means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon National and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

National and State Forests under Federal and State Ownership, administration and management respectively; adequate appropriations for their care and management; Federal co-operation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners, non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Forest Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by co-operation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid the lumberman in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

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